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MODEL AIRPLANE NEWS

NOVEMBER 1949 • 25 CEN



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By BILL WINTER

AFTER reading Dick Schumacher's gripe and June Pierce's comments re beginners in a recent *"Scrap Box,"* Harry Copeland, director of the *Syracuse Model Airplane Club*, actively sponsored by the Exchange Club of Syracuse since 1933, decided to speak his piece. Bear in mind, gentlemen, that Copeland has one of the country's outstanding records as a real leader and pioneer. Dope like this is hard to come by.

"In my opinion," begins Copeland, "there are two reasons for the continuing decline in junior participation at model meets. One is lack of elementary instruction in model building and the other, lack of interested leadership in model clubs. In the first instance, I submit that the fault lies with the great majority of our educators who have failed to provide such instruction in the Industrial Arts curriculum of our secondary schools—where it logically belongs.

"In the second instance," Harry continues, "many existing model clubs have displayed a sad lack of leadership in virtually ignoring new builders who are eager for instruction and guidance. Until such times as our educators recognize that we are living in the air age and that air age education should be provided for our air minded youngsters, existing model clubs must carry the ball. They should also schedule more glider and rubber-powered free-flight contests for junior-age groups. The many exclusive controline contests automatically limit junior participation for two reasons: lack of experience and lack of funds."

Copeland also promises complete figures on age group participation in sanctioned contests in the Central New York area from 1942 to July 1949. These figures show clearly that adult participation has gained most since 1946, not only in controline and free flight events, but also in glider and rubber-powered events. This information we hope to present in a near future issue. Meanwhile, we should like to toss a few sticks of our own on the fire, with fervent wish that the fire be built under our Open class builders and leaders.

By the time you read this the AMA Committee on Clubs and Chapters will have turned in a report which benefited by the advice of dozens of leaders who really know the score. For what isn't done and should be done for the younger modeler is a sad commentary. If these people seem fascinated with the point that haphazard leadership, or the downright lack of leadership, is preventing many thousands of boys from enjoying and profiting by our hobby, one has only to look at the outstanding successes in some localities to realize the contention is so right. But let's get back to Copeland.

"Like others, I too have encountered over the past years," Copeland adds, "the same selfish indifference on the part of many older modelers. They have no time for beginners who are left on their own, without guidance and leadership—to learn the hard way. I hesitate to guess at the number of youngsters who have become discouraged with model plane building for this reason.

"My attempt to solve the problem was the inauguration last winter of a model plane-building course for *youth leaders*. While the first class was small, due to insufficient advance publicity, we hope to have a similar class this winter for eight weeks' duration. For more than ten years I have been trying to get such a course into our State Teachers College. Until this becomes an accomplished fact, we, in model aviation, must provide the instructors and leaders for our air-minded youngsters."

Before us is a batch of clippings from the SYRACUSE POST-STANDARD, which give the leader-training course more credit than Copeland modestly allowed. The first course of its kind in the Empire State, offered by the Syracuse Adult Education Department, headed by Miss Helen B. Hewitt, with classes under direction of Stanley Zamory, Director of Industrial Arts and Apprentice Training, attracted both men and women from the city schools, YMCA, Syracuse Recreation Department, House of Providence, Boy Scouts, Cub leaders, Detention Home, and the *Syracuse Model Airplane Club*. Entirely free, with materials furnished by the Exchange Club which instigated the program, the course featured the building of three elementary flying models, adjustments for flying these models, theory of flight, plane design, and construction short-cuts. The kits used were suitable for beginners of 9-14 years of age and public groups. Not overlooked were those allied subjects—How to Run a Contest, and How to Form Local Model Airplane Clubs.

You know, it gets more and more difficult to cope with the discussions that spring out of some contributors' comments in the *"Scrap Box."* In the recent past some comments were made on radio control, to the effect that a walloping movement is shaping up but that things are tied in a knot by the FCC's reluctance to dispense with the license requirement. Brother, did that start something! Two manufacturers and one willing-to-be manufacturer were among those disputing our slant on license requirements. It looks as if the manufacturers don't agree among themselves. Last we heard, some of them were in there fighting hard for relaxed rules on 52-54 mc., experimenting with 27 mc., and so on. The Citizens Band—which requires no license—has been pictured as undesirable and unacceptable, at least temporarily, for modeling purposes. A sealed transmitter that could not be tampered with, and which would be made under FCC supervision, was one fly in the ointment. Before launching into what is certain to become just the first round in the battle of radio control, the *"Scrap Box"* points out that what follows may be only one side of the picture. Objections may exist and undoubtedly will be registered by other people interested in this field. Full discussion will be encouraged and continued for whatever good may come of it for a phase of modeling that most certainly is on the verge of going to town.

"You did not mention that FCC already has taken steps to allow fliers to use radio control without the necessity of becoming a radio amateur," says Vernon C. Macnabb, a manufacturer's representative for radio, television, and electronic components, located in Indianapolis. "The FCC opened a Citizens Band June first, and I am enclosing a few photographs of equipment designed by an engineering firm here in Indianapolis. The antenna is only one foot long and is attached to the transmitter. The receiver draws 0.2 ma. when no signal is being given and the current jumps to

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MODEL AIRPLANE NEWS

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BURIED IN THIS AD are most of the new items. Sometimes there isn't time or space to include them. But, if available, we have it.

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PROPELLERS

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11" in 10",12" pitch 5/		1.00
Also all sizes of Power,Top-flight, Ohlsson, Rite Pitch, Excell,Super Dynamic,Flo-Torque100		

RUNNING & TEST BLOCKS

Universal Running Block ...	1.50
E-Z Running Stand	1.25
Madewell Test Block	2.25
Bright Test Block	4.95

METAL GAS LINES

Fromm: 1"x½ or 2 hor.-or vers. .75

1"x1x2 Sq.	.80
1"x5/8x2"x Wedge	.90
1"x1x2"x ½-Rnd Stunt ...	.90
1"x1x1½ ½-Round ...	.85

Naeco	.85¢ & 1.00
Minitank (smallest)	1.25
Dale Tanks	.65

FITTINGS

A & B - 1.00; C & D	1.50
DeLuxe 3/16" shaft - 1.25.1/4"	
Shaft - 1.50.5/16".3/8"sh.1.75	

STORAGE BATTERIES(WET CELL)

Rechargeable 2V Flight 2.35
4V Booster 3.50 5.00

IGNITION PARTS

Wico -	1.95	Arden -	2.50
O.K. -	1.75	Rogers -	2.00
Winston -	2.00	Regular -	1.50
Spitfire -	1.50	O.K.Twin -	5.00
Aero Twin -	4.00	Aero Qual-	3.00
Aero Featherweight			2.50
Smith: Competitor - 1.95,Firecracker - 2.75			
Dual			4.50

CONDENSERS

Regular - .20;	Heavy Duty -		.25
Aero Metal - .35;	Heavy Duty		
Metal - .45;	Rogers -		.20

SPARK & GLO PLUGS

(Champion V,V2,V3,VR1,VR2.. .50
Sparkplug washers ..... .05
Arden Glo (V2 or V3) - .65 & .85
Ohlsson Glo (V, V2 or AA)- .65
Champion Glo V,V2,V3 ..... .75
McCoy Hot Point ..... .85
Glo-Plug.....(spl)... .65
Infant Glo-plug..(spl)... .85

CHOKE & ACCESSORIES

6 Ft. Hook-up wire ..... .25
Alligator clips ..... .10
End Clips, 2 for ..... .10
Tip Jacks(set) for booster .60
Arden Booster Jack 1.25
Austin Booster Plug-in .... .30
Copper Lugs, 12 for ..... .25
Hedgit Easitch-slide .30eTurn-.50
Ohlsson Snap-Pack..... .35
Arden Battery Cord kit .... .35

FUEL LINE

5/8" -20¢; 13/16" -25¢;1-1/4 65
1½" -85¢;1-3/4" -90¢; 2" .. .95
2¼" or 2½" - 1.00; 2¾" ... 1.25
3"Needle Nose 1¼" dia.... 1.15
2" 1.20
Adapter Nuts (state eng.) .. .20
Plastic 1½" ..... .50

FUEL TANKS

Poly-arc Streamlined (pr)1½" .45
2" - 50¢, 2¼" ..... .75
Pneumatic (pr) 2½" ... 2.50
3" - 3.00, 4½" 3.50
Semi Pneumatic(pr) 2" .85
2½" - 1.00, 3" 1.50
Rubber Gear Limit(pr) .25
7/8"-25¢,1-1/8"-30¢,1-3/8" .30
1-7/8" - 45¢, 2-3/8" .... .60
Sponge Rubber, Wood Hub (pr)
2"-40¢, 2½"-50¢, 3" .... .60
Trexler Pneu.(pr) 1¼" or 1½"-40
1¾",2"-50¢,2¼",2½"-60¢,2¾"1.00
3"-1.25,3½"-1.50, 4" 1.75
Tail Wheel: 7/8"-10¢; 1-1/8"-15
Sparky Tail Wheel Assembly .25

CUTTING ACCESSORIES

Metal,side by side,penlite .40
medium - 40¢; regular .... .50
4-pencil ..... .60
Plastic,end-to-end pen..med. .40
Plastic,for 6 penlites 1.25
Paper ..... .25

FLYING LINES

Acrylic metal 1.50
Hillcrest plastic 1.25
Arden plastic 1.85
Stutter-off Valve ..... .75

MISCELLANEOUS

No. 70 oil,3 oz.-.25¢; pint	.60
Presto Disc Starter	.25
Coil Holder	.15
"Spinit" Starter	5.00
Metal Pump Can .... .75¢ &	1.50
Tiger Fuel Pump	.69
Fuel Line Filter	.35
Motor Cover	.25
Elgin Stop Watch	12.50
Widget Screw Driver	.10
Metal Motor Mounts,Sr.-30¢,Lg.-	.50
.006,.008,.010,.012,.014,.016 dia. 2-52' lines	.50
.010,.012,.014,.016,.018, .020 dia. 2-70' lines	.65

HARDLEY ADJUSTABLE LINES

.008-.011,.014 2-70'	.65
2-150'	1.00
Stranded .015,.021,.55'.75; 70' 1.00;100' 1.95; 200'	2.75
U-Reely Contr.-7.50;cable	8.50
U-Reely Remoto	12.50
Jen Contr.Handle(pistolgrp)	2.50

3 Ready-to-run Leaders

FREE PREMIUMS INCLUDED



THOR B $9.95

Everything you want in your engine A REAL POWER PLANT !! .29 displ.. 1/6 horsepower, weight 4 ounces. Class B

IN KIT FORM $6.95



GENIE 29 $6.95

BOYS! Here is the engine you've always wanted. An engine that's been acclaimed the "easiest starting gas engine". .29 displ.. 1/6 horsepower, weight 4 ozs., Class B. Good for glo-plug.



RAM $6.75

With features that step-up power, give longer life with lighter weight Class B. .292 displ., 1/6 h.p. 6800 rpm, weight 4½ ozs.

DUAL RAM INCL. GLO PLUG $6.95

Neoprene Tubing, per foot.	.30
Transparent	.15
Gasket Paper	.25
Plug Wrench,3-way-.15¢;4-way ...	.50
Socket Plug Wrench,4-way ..	.50
Universal Needle Valve ...	.50
Flexible	.75
Needle Valve Exten.Flexible ..	.35
Log Book	.10
Extension Shaft 4½"	2.00
Bolts & nuts,¼"-1",1½"-	12/ .20
Elevator control horn	.25
Horns(beller.)2"-10¢, 4" ..	.15
Speed Indicator Tables	.10
Elevator hinges 4 for	.05
Swivels, small 15cpr, large	.20
Adjustable Push Rod set ..	.25
Take-off Dolly kit	1.00

Thumb-it Control Handle ..	1.95
Control-it Elev.Contr.Unit	1.95
Wood Control handle	.25
Metal Handles	1.00&1.25
Wood Control Reel ... 1.00 &	1.25
E-Z Plastic Control Handle	.85
Simplex Handle & Reel	1.25
Metal Flight Reel .1.00 &	1.25
Reel,Handle,Crank kit	1.25
Stunt Bellcrank & Flev. horn	.25
Veco Bellcrank	.25
Elevator control horn	.25
Horns(beller.)2"-10¢, 4" ..	.15
Speed Indicator Tables	.10
Elevator hinges 4 for	.05
Swivels, small 15cpr, large	.20
Adjustable Push Rod set ..	.25
Take-off Dolly kit	1.00

GAS MODEL BOATS

Chris-Craft Cruiser 26"C-D	5.50
Owens Yacht 26" B-C-D	5.50
Marco 25" B-C-D	5.50
Chris-Craft Runabout 25"BCD	5.50
Chris-Craft Express 25"BCD	5.50
Vinyard 25". BCD	5.50
Dumas Electric Drive Unit	
for 6 above ships.....	4.00
Marine Drive unit for 6 abv	2.75
Buckeye prefab. 17" A-B-C	4.95
"Cabin Cruiser 17" ABC	5.95

6 DIFFERENT GAS POWERED BOATS ILLUSTRATED IN OUR CATALOG

THIMBLEDROME & ACCESSORIES

Thimbledrome Race Car ...	3.95
Champion car ready to run with Cox Engine.... 21.50 &	19.95
Cox.15 or .099 Engine only	9.95
Cox 199 Engine only.....	10.95

ALSO ALL COX PARTS

U-CONTROL ACCESSORIES

Aristrol Plastic Handle ..	.75
Flexible 2-52' 1.50;2-70'	1.95

ENGINE PARTS!!

EVERY part for EVERY ENGINE listed on these pages IS IN STOCK at America's Hobby Center. Send today for the parts you need to keep your engine in flying condition. All parts are factory-made by the original engine manufacturer!

MAKE A H C YOUR GAS MODEL HEADQUARTERS!!

NEW! 24 PAGE 2-COLOR CATALOG

The NEW America's Hobby Center giant 2-color 24 page (each 8½" x 11") Summer Catalog # 19 is just off the press! Over 50,000 items that every modeler needs are listed and illustrated. There's a whole page of Pee Wee engines, planes and accessories, 5 pages of models for gas engines (over 150 U-Control Kits, over 50 Free-Flight models!), there's a whole page showing all the gas engines, page after page of accessories, supplies, etc., etc. For the non-gas modeler there's gliders, rubber jobs, ships and powered boats and ALL the latest race cars, plus special articles on plane and engine selection, flying, wiring, trouble-shooting, control-line tips, launching, etc., etc.

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SPECIAL! BARGAIN!

Complete FLYING OUTFITS

WORTH TWICE OUR COMBINATION PRICE!

IT ISN'T OFTEN that you get the chance to buy, at less than half price, a U-Control Plane, Engine and All-Accessory Outfit with your own choice of 24 well-known FACTORY ASSEMBLED ignition or glo engine. Everything carries the famous America's Hobby Center guarantee.

Even if you are a beginner, you won't have trouble building and flying any of these flying outfits, full-size plans of an easy to-build and fly plane, every accessory you will need, complete instructions, etc., etc. If you are an old-timer at building and flying model planes we don't have to tell you what these bargain outfits are really worth.

Thousands of these complete units have already been sold. They have met with enthusiastic reception because they represent a value unheard of before in the modeling field. The price is so low that we cannot sell to dealers. You really save from $10 to $12 by buying the complete, packaged unit - everything is engineered by experts for a perfect flying combination.

Your own choice of 24 well-known, factory assembled engines, all guaranteed by the manufacturer and America's Hobby Center.



JUDCO Ignition or glo | GENIE Ignition or glo | RAM Ignition or glo

YOUR CHOICE $10.00



McCOY 19 GLO | THOR Ignition | OHLSSON 19 or 23 Rotary valve glo

YOUR CHOICE $12.50



McCOY 19 Ign. Ball bearing & rotary valve | OHLSSON Ign. 19 or 23 Rotary valve

YOUR CHOICE $13.50



ARDEN 099 Ball bearing Ign. or glo | OHLSSON 29 Ignition or glo | PHANTOM Ignition or glo | SPORTSMAN 29 Ball bearing & rotary valve

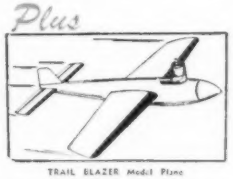
YOUR CHOICE $15.00



BUZZ 8' Ignition or glo

$8.50

Plus



TRAIL BLAZER Model Plane

TRAIL BLAZER Model Plane with carved lower fuselage-half, fully formed aluminum upper half. Balsa sheet wing, no tissue used. Balsa tail surfaces, plywood engine mount. Schematic drawings with step-by-step plans. Rubber wheels, detail paint schemes.

Plus not 75, not 100 but ALL **ACCESSORIES including:**

● PLUS: Correct size finished propeller ● 3-way plug wrench ● Presto Engine starter with handle and cord ● Speed indicator tables ● Log Book ● Motor cover ● Spark or glo plug with gasket ● Complete engine instructions ● 24 page Gas Engine Theory Manual ● Engine adjustment chart ● Metal fuel tank and gas line ● Metal Battery box ● Wilco Quality Coil ● 12" Hi-tension lead wire and end clips ● 18" insulated ignition wire ● Ignition slide switch ● Coil holder and mount ● Everlast condenser ● SAE = 70 Oil ● 4 ignition wiring lugs ● Spark plug guage set ● 2 plane identification tags ● 72 insignias ● 72 page book on Control-liners, How to build and fly them ● Cement ● Sandpaper ● "Pro" all-metal knife and blade ● Metal bellcrank with bolt, nut and washer ● Elevator horn ● Elevator hinges ● Lead-in wire ● Push-rod wire ● U-Control handle ● 100 feet U-Control stainless steel wire and reel ● Membership in Modelcrafters of America ● 24 page giant 2-color catalog ● Postage ● Packing ● Insurance.

Ignition parts not needed with glo engines not included

YOU WON'T GET OTHER BARGAINS LIKE THESE!

Complete RACE CAR OUTFITS

COMPLETE OUTFIT AT ABOUT 2/3RDS THE ACTUAL COST IF ITEMS WERE PURCHASED SEPARATELY!!

Everyone is racing the new Thimbledrome race car, the little 10" model that cannot be beaten for realism, craftmanship, speed and lasting pleasure. Speeds from 15 to 70 miles per hour. You can race this car in a schoolyard or any small, level space.



THIMBLEDROME RACE CAR

Your own choice



with BUZZ ENGINE only $10.50



with BANTAM ENGINE only $15.50

Plus all accessories

Your choice of two well-known engines, ready to run ● Glo plug for new, ignitionless engine operation ● Metal fuel tank ● Neoprene gas line ● Complete engine instructions ● Battery connecting wire ● Mounting bolts ● Mounting nuts ● Motor cover ● Pamphlet on glo fuels ● Plug wrench ● Thimbledrome race car complete includes rubber race tires ● Complete instructions for installing and running engine ● Motor mounting bracket ● Flywheel ● Yoke ● Tether cord ● Membership in Modelcrafters of America ● Postage ● Packing ● Insurance ● Full A. H. C. Guaranty ● 24 Page Giant Catalog.

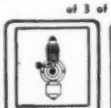
Everything you will need except a 1½ volt battery, fuel and a small file for cutting away parts of the body to install the engine. In addition, mounting and motor shaft holes must be drilled.

Scoop! *Complete* PEE-WEE FLYING OUTFITS

These are the new pint-size glo engines that are so tiny (1 to 1¼ ounces) but develop plenty of power for free-flight or U-control flying.

Your own choice

of 3 of the best, all fully guaranteed:



INFANT $6.95



SPITFIRE $7.45

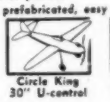


CUB $7.95

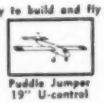
Plus your choice of planes: All planes prefabricated, easy to build and fly



free-flight



Circle King 30" U-control



Puddle Jumper 19" U-control

Plus all accessories

You get the same accessories listed in our other flying outfits (excluding those not needed in a glo engine, of course). Everything needed to build and fly planes shown except fuel and starting battery.

Complete CO-2 FLYING OUTFITS

For the younger set, their Fathers and big brothers, there's nothing like the thrill of CO2 flying. You don't need much space for free-flights (100 feet square on windless days!, and less than a twenty foot circle for tethered flying.

THERE'S NOTHING TO LEARN AND PLENTY OF FUN!

CAMPUS BEE OR BUZZ CO2 Engine

$6.45



(includes refillable tank, capsule charging unit). Costs only 2c per flight to run. Plus Cavacraft Stinson, Berkeley Profile Powerhouse or 19" Puddle Jumper. Kits are completely precut and shaped, ready to assemble!.

O.K. CO2 Engine

$6.95



(largest CO2 engine made! with the famous contest-winning 33" Powerhouse kit, (Most CO2 contests during 1948 were won with this matched combination of plane and engine)or 19" Puddle Jumper.

CAMPUS A-100

$7.95



(Smallest CO2 engine made, includes refillable tank). Costs only 1c per flight to run. Choice of Cavacraft Aeronca kit with Cava-Cut parts, completely precut and ready to assemble or the World War I fighter biplane, the S.E.5.

Plus all accessories

CO2 Engine, ready to run ● CO2 Capsule holder ● 2 CO2 Capsules ● Correct propeller ● Complete Engine instructions ● Complete suitable airplane ● Landing gear ● Wheels ● Complete plane plans ● Cement (if needed) ● Flight log ● Insignia ● Identification tags ● Packing ● Postage ● Insurance ● Membership in Modelcrafters of America ● 24 pg. Giant model Catalog ● Full A.H.C. Guarantee.

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NOW!! BUZZ GLO ENGINES . . . . .

.....have been produced by popular demand! BUZZ Engines have been used in every type of model flying, U-Control, Free-Flight, Radio Control, and now the same high-quality engines are available as Glo-Engines. These engines are the simple, dependable BUZZ engines that in the past year have been time and field-tested by over 20,000 modelers! You'll enjoy more hours of flying per dollar investment with BUZZ Engines!



Rising Costs...

have been offset by the tremendous demand for BUZZ ENGINES. That's the only reason we are able to continue to offer you these Ignition BUZZ Engines at only $4.95! Note we have been able to reduce the price of the "60"..... it, too, is only $4.95!

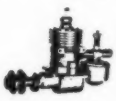
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GLO BUZZ 19, 29 & 35

$4.95 EACH

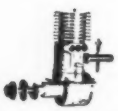






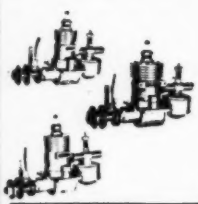
The interchangeable Class A, B and C Buzz Engines in glo-plug operation! The BUZZ 19, 29 & 35 Engines lead the field in low-cost FLYING FUN! Thousands of modelers all over the world depend on the rugged construction and easy starting of BUZZ Engines every day for their FUN in FLYING. Can be interchanged on the field so you can fly the same model in Class A, B or C.....the crankcase mounting holes are identical.

GLO BUZZ "60" $4.95



.....for large Class D models in Free-Flight or U-Control or as a simple way to avoid ignition interference for radio-controlled flying! Wherever you have a lot of airplane to haul skyward, use this power-packed "60". It's the engine that generated power for the field-command radio sets with the Army during the last War. A flip will start it and you'll have continuous, smooth power for every flight.

The BUZZ 19, 29 & 35



EACH $4.95

Thousands of modelers all over the world have depended on these ruggedly-constructed, easy to start BUZZ A, B & C Engines. They've changed engines on the field and have flown the same model in all three events...not once, but repeatedly, contest after contest. Four screws to change and your plance flies in a different class....the crankcase mounting flanges and screw holes are identical in all three engines.

$4.95 ASSEMBLED & TESTED

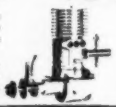
A BIRTHDAY WE'RE PROUD OF

BUZZ Engines recently passed their first Birthday. One year has passed of selling these famous engines to hobbyists all over the world. The letters and enthusiastic comments we have received make us proud of the fact that we can supply quality engines at this low price of $4.95

Use the BUZZ "60"

for the same dependable, easy starting smooth power that thousands of modelers have been enjoying since this engine was first offered a year ago. This is the engine that powered field-command radio sets during the last War.

Use the Buzz 60 for your large Class D Free-Flight or Controline model. Each engine is factory tested and will provide you with smooth, dependable power that will avoid crack-ups and disappointments in contest or sport flying.



NOW! $4.95

BUZZ CO2



ONLY $4.95

The BUZZ CO-2 Engine is the first 3/16" bore 6 stroke engine on the market. Thousands have been sold and thousands of modelers have enjoyed the dependable power and economical operation of this intermediate-size engine. The refillable tank allows five flights per CO-2 Capsule less than 2c per flight! Engine is complete with refillable tank connected to engine and a capsule tank-charging unit that is die-cast.

Some facts about BUZZ Engines.....

SPECIFICATIONS:

	19	29	35	60	CO-2
Displ.	.199	.299	.359	.610	——
Bore	.660	.812	.880	1.000	3/16
Stroke	.562	.562	.562	.779	3/16
Horsepower	1/9	1/6	1/5	1/4	——
RPM	2,500	8,000	8,500	9,000	variable
Prop	6"	10"	11"	12"	5½
Weighs	4	4½	4½	9	¾

The BUZZ Engines are manufactured by a company that for years has been the world's largest maker of automobile replacement pistons and other precision gasoline engine parts. Thousands of gas engines and parts were made during the war by this company for the War Dept. for use in walkie-talkies, field generating sets, etc., etc. Since the war, thousands of gas engines have been made for scooters, lawn mower and other industrial uses. When we say unconditionally that the BUZZ engine is well engineered and well constructed will give you plenty of good service, this is no idle boast, but a fact!

ACCESSORY UNITS

For IGNITION Engines...only $2.49

Spark Plug & Gasket • Wire Quality Coil • Hi-Tension Lead Wire & End Clips • Enclosed Condenser • Correct Size Finished Propeller • Ignition Slide Switch • 2-Way Plug Wrench • 4 Wiring Lugs & 4 Mounting Bolts & Nuts • Presto Engine Starter, with cord & handle • Spark Plug Gauge Set • Motor Cover • 24 Page Gas Engine Theory Manual • Log Book • Engine Adjustment Chart • S. A. E. No. 70 Oil • Coil Holder and Mount • Metal Fuel Tank • Gas Line • Metal Fenite Battery Box • Insulated Ignition Wire

For GLO Engines...only $1.49

Glo Plug & Gasket • Insulated Ignition Wire • Correct Size Propeller • 2-Way Plug Wrench • Mounting Bolts & Nuts • Presto Engine Starter, with cord & handle • Motor Cover • Log Book • 24 Page Engine Theory Manual • Fuel Formulas • Metal Fuel Tank • Gas Line

For CO-2 Engines...65c

Correct Propeller • Motor Cover • Lubricating Oil • 2 CO2 Cartridges

AT NO INCREASE IN PRICE!

BUZZ IGNITION ENGINES

Order today!

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Send remittance in full (we prepay packing and insure) or send $1 and we ship collect C. O. D. same day for balance. Address your order to us at your nearest branch office.

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AFTER HEARING the sworn testimony of top Air Force officers (both present and past) and major aircraft manufacturers, the House Armed Services Committee has completely whitewashed the case of the Convair B-36 bomber and given the huge craft a clean bill of health on both counts: its performance is superior to that of any other intercontinental production bomber in the world and there was absolutely no politics involved in its procurement. Cause of the controversy was a secret nine-page report by Cedric Worth, special assistant to Under Secretary of the Navy Dan A. Kimball, handed to Rep. James Van Zandt (R., Pa.), containing vicious rumors regarding combat inferiority of the 150-ton monster bomber, political favoritism in its purchases and the naming of Secretary of the Air Force Stuart Symington, Convair Board Chairman Floyd Odlum, and Secretary of National Defense Louis Johnson as involved in a gigantic merger plan seeking to control the national aircraft production program. But after hearing reams of testimony, during the course of which tempers flashed and secrets were laid bare, the B-36 came through absolutely unblemished and those connected with its procurement untainted.

IT WAS inevitable that the hearings should produce performance figures on the B-36 and here are some of them: B-36D with four General Electric J-47 turbojet engines in wingtip pods, has a top speed of 435 mph and a ceiling above 50,000'; B-36B has flown a mission of 10,500 miles and dropped its load of 10,000 lb. of bombs half-way; B-36B has remained above 40,000' for 20 hours, covering 6,000 miles at an average speed of 300 mph. Nearly one billion dollars are invested in the B-36 project, including the cost of building 250 of the giant craft. Current production models average $6,248,686 EACH, including the cost of spare parts, equipment, etc.!

AT ONE POINT the hearings turned into virtually an Air Staff meeting when Gen. George C. Kenney (former Strategic Air Commander) and Lieut. Gen. Curtis E. LeMay (present SAC commander) argued publicly over tactical use of the B-36. Kenney stated that he would order the B-36 only on night missions at high altitude, conditions under which enemy fighters (even jets) would have a difficult interception job. LeMay stated flatly that he would order out the B-36 day or night and ride the lead plane himself!

ONLY OTHER current aircraft competitive with the B-36 is the Northrop *Flying Wing* bomber. The B-35, powered with four Pratt & Whitney R-4360 *Wasp Major* engines, proved unsatisfactory due to repeated engine-propeller troubles and this installation was finally abandoned through no fault of the airplane design. The eight-jet B-49 *Flying Wing* has a top speed of 532 mph and can fly above 50,000', but it is too unstable for a satisfactory bombing "platform." However, Northrop is planning a version powered by the 10,000 hp Northrop *Turbodyne* turboprop engine, which will have a range of 10,000 miles with a 10,000-lb. bomb load. One of the original B-35 bombers is now being modified to this configuration to test this huge engine.

ONE OF THE secrets contained in the Boeing B-47 *Stratojet* bomber, which the Air Force has selected as its future standard type, is the use of a rate-gyro control system, which is used to eliminate Dutch Roll oscillations in flight. The heavily swept-back wing of the XB-47 gives the aircraft unsatisfactory directional stability, which produces the Dutch Roll (a weaving motion in the air with first one wingtip and then the other moving forward while the airplane rolls gently right and left). The rate gyro is sensitive only to the *rate* of displacement of the airplane, not to the *amount*, as in the conventional automatic pilot. This electronic device makes instant corrections when the Dutch Roll begins, thereby giving the XB-47 satisfactory flying qualities.

THE UNITED STATES has been placed neatly behind the eight-ball, for the first time in its history, by the successful first test flights of the British DeHavilland DH-106 *Comet* and Canadian Avro C-102 jet transports. The two flights, only two weeks apart (what an internal race that must have been with both plants receiving hourly reports on the other!), put the U.S. three to five years behind the jet transport race for not only do we *not* have a jet transport flying but there is none under construction or even planned! Both British jet transports are big and fast but are considerably different in purpose. The *Comet* is designed to carry 36 passengers at 500 mph across

(*Turn to page* 54)

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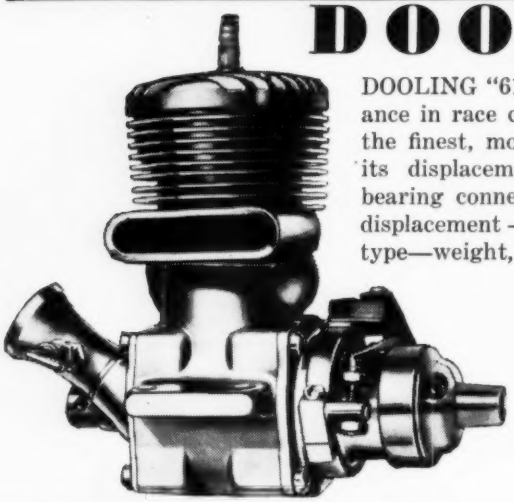
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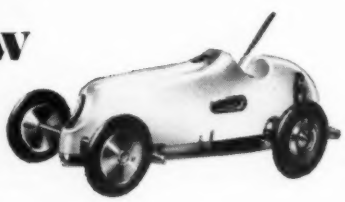
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Scrap Box

(*Continued from page* 1)

1.5 ma. with signal. This means that B-batteries may be of light weight hearing aid type and still give long life. The antenna on the receiver is nothing but a 2½" square piece of aluminum with no critical adjustments. There are no critical adjustments on the transmitter.

"As you know,' goes on Macnabb, "the equipment must have its design approved by the FCC, and then be manufactured under their supervision which eliminates the possibility of anyone making it themselves. This FCC equipment can be operated legally by filling out a card and sending it to Washington, which qualifies the user for a license.

"We have successfully designed, built, and flown equipment which will operate on the Citizens Band, and I think this band is the answer to our problems on radio control, so let's promote this type of flying on the Citizens Band which can be done legally and effectively."

Thanks, Vernon Macnabb, for this interesting slant. Remember, men, there are lots of *ins* and *outs* to this question, so let's reserve final opinion until all precincts have been heard from.

Harry F. Hillman, Pentwater, Mich., chips in with more pertinent comments on this license business: "I would like to call your attention to the proposed Amateur Radio Regulation which may make it possible for the model builder to control his own R.C. model and not have to bother with a ham. These regulations appear on page 20, the June issue of QST. These proposed regulations provided for an experimentor class license. To obtainr this license the applicant must pass a simple code test and a technical and regulations test. The code test requires five words a minute which is the same as the Boy Scout requirement. In several years as a Boy Scout leader I have never seen a boy who had too much trouble with this requirement. To pass the written test you merely have to obtain a copy of the test from the American Radio Relay League with the correct answers and memorize it. If the average model builder spent an hour a day on the code and test, he would have an experimentor's license by the end of the week.

"This license," continues Hillman, "provides for operation above 200 mc., so our equipment would have to be redesigned. If these regulations are voted in, I plan to get a license and do some experimenting with equipment for this frequency."

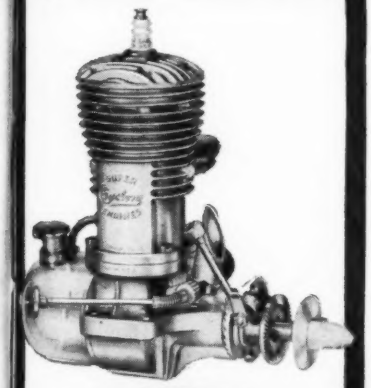
Well, Finland won the Wakefield! A. S. Ellila, a 26-year-old chemistry student from Helsinki, flew a ten-year-old slabsider (which must have been made when he was a 16-year-old Junior) with two rubber motors geared to operate in tandem, with double gears at the end of the fuselage. Due to the occasional rain, and wind of 27 knots, with gusts, our own Ed Lidgard was prompted to remark "an ambitious janitor couldn't have swept up the pieces as fast as they were made."

Ellila, incidentally, says that the only reason he was flying a ten-year-old model was because "supplies are virtually nonexistent in Finland." This was the reason that a team of six couldn't be raised to go to England. Ellila says he will have a new ship next year, identical to the old one, but with a larger prop. Seems to us that gears offer a good percentage under some circumstances.

Speaking of ideas, dropped into Junior Aeronautical to select balsa for a new radio job (57" with an *Arden .199*) and ran into Frank Ehling. Frank's been using a powdered shoe dye used in manufacturing footwear, which is mixed with alcohol and swabbed onto undoped covering. It cuts through dope and glue so coloring comes out even and transparent. John Zaic had a glass medicine dropper for tank on baby engines. This dropper is glued to the side of the fuselage, with its top somewhat above the intake, with most of the tube below the intake. This gives a combination of gravity and suction flow, the latter as gas level drops in tube, so

(*Turn to page* 38)

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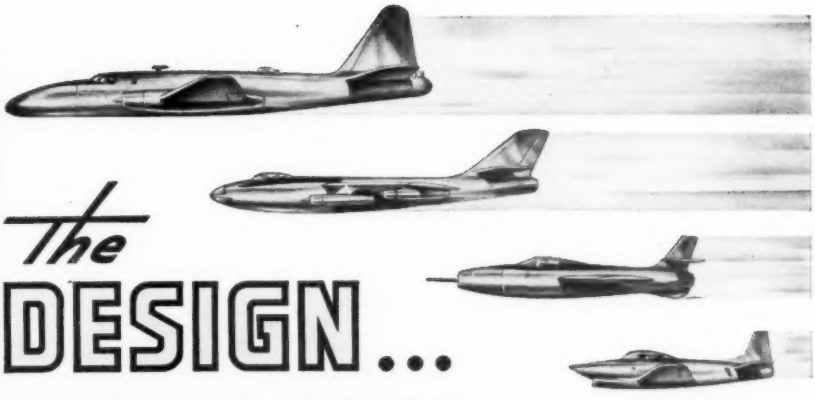
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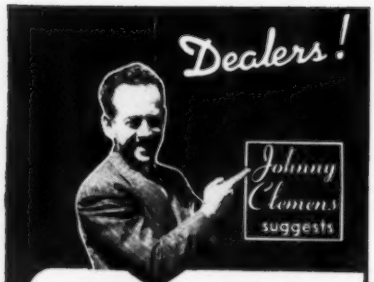
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REPORT FROM THE WEST

by Lew Mahieu

WITH the National and International Meets over, the contest season is coming to a slower pace.

Although all the top West Coast modelers were not at the Nationals, California held its own by taking 26% of the prizes in the top three places. California also claimed the Senior, Open, and Club Champions this year.

At the Plymouth International Meet the boys from the West Coast fared okay, Henry LaVon of Tacoma, Wash. winning the Novice High Point Trophy and Charles Schuette of Los Angeles, the Open High Point Trophy. The California boys were limited to twenty-six fliers which prevented a walk-away with the awards.

The trip by car to Detroit was pleasant with only a few surprises. We started out August 18 about seven in the evening with Don Kennedy, Bill Tharp, and Charles Schuette. We drove nearly two hundred miles and decided to stop for coffee; only then did we discover that we were just about to lose one of the boxes from the top of our car with four planes inside. The rope used to hold the box broke and with nothing to hold it, disaster would have resulted in another mile. The rest of the trip went smoothly, however. Before we reached Michigan, we stopped in Auburn, Ind., for dinner. While there, we talked to Mr. Clouse, whose hobby is collecting old electric, steam and gasoline autos and rejuvenating them. He showed and demonstrated one of his eight restored autos, a 1920 Milburn electric job. We were really thrilled when Mr. Clouse gave us a ride around Auburn, and we can truthfully say that his Milburn is about as slick riding as most new cars. Using his own charger, he said the operating expense is fourteen cents for sixty miles. This makes us wonder if the automobile is really advancing!

We arrived in Detroit Sunday midnight, and after three days and three nights of continued driving, we were really glad to see and enjoy sleeping in a bed again. The following seven days of competition was run off at Selfridge Field and Belle Isle Park. The awards banquet was as fine as ever with the food and entertainment the best that could be obtained. The return trip was made with Denny Davis and Jack Butler. It was a long grind but at last we're back in good ole Californey.

* *

Carl Stokes sends us the results of the *West Seattle Modelers* contest held July 17 at the Arlington Airport, Wash.

PAA-Load Class B Open—1. Henry Cole 14:34; 2. Charles Hollinger 10:54; *Jr.-Sr.—1.* Dave Lefebere 12:37; 2. Dick Larson :15; *Rubber Cabin R. O. G.—1.* Maurice Henkshley 162 secs.; 2. Charles Riggs 157 secs.; *H-L Glider Open—1.* Wallace Betzina 120 secs.; 2. Leslie Weinholtz 100 secs.; *Jr.-Sr.—1.* Carl Stokes 153 secs.; 2. Gilbert Coug 93 secs.; *Free Flight Gas (Classes A, B, C, & D combined)—1.* Charles Riggs 18:34; 2. E. I. Ebenson 12:70; *Class ½A* (.00 to .050) *Jr.-Sr.—1.* Dave Lefebere 63.0 secs.

Results of the Pan American PAA-Load event held in conjunction with the *San Francisco Vultures* Free Flight contest at the Warm Springs Airport, Sunday, August 14: *PAA-Load Class A Open—1.* John Tatone 5:09.4; 2. Bill Gunther :44.9; 3. Dick Chamberlain :27.0; *Jr.-Sr.—1.* Angelo Lo Castro 3:14.6; 2. Steve Korbay 3:06.5; 3. Einar Enevoldson :06.0; *Class B Open—1.* Manuel Andrade 5:00.4; 2. Charles Pottol 2:26.4; 3. Al Boissevain :05.3; *Jr.-Sr.—1.* Laddie Loyd :22.2; 2. Myron Hoffman :18.9.

The following are a few field notes by the PAA-Load Contest Director, Harvey S. Robbers, Sr.:

"Wind, that uncontrollable element, did its best to ground our miniature air force. The turn-out of modelers was very good and the number of spectators was exceptionally high. It took a hardy soul to risk complete loss of his model by flying into the heavy wind which prevailed nearly the entire day. Models built specifically for the PAA-Load event proved to be unusually good soaring gliders once they became airborne. This event is destined to be one of the most popular at free flight contests. The take-off and climb is realistic and has the spectator appeal. Truly, when they splash, it is a very complete job with little chance of repairing and getting back into the contest. High times were impossible with the wind blowing the models low and out of sight in very little over a minute's time.



Bill Butler with a Class D stick model

"Ray Matzinger and James Robbers, timers for the event, were very thoroughly briefed and did an accurate, commendable job along with the dispatcher, Jimmy Robertson. Mom Robbers took a postman's holiday from the YO-YO contests and was registrar for the event."

Results of the *Palo Alto U-Liners* contest held on August 21: *Precision Class AB Expert—1.* Robert Bowmer 348 pts.; 2. M. C. Kyle 330; *Advanced—1.* Ronald Kambestad 367; 2. W. C. Rice 322; *Beginners—1.* John Selva 326; 2. Mark Brown 325; *Class CD Expert—1.* Robert Bowmer 373; 2. Ray Regalia 369; *Advanced—1.* J. J. Swenson 350; 2. John Lenderman 335; *Beginner—1.* Herman Shiman 318; 2. Don Bekins 280; *Flying Scale—1.* Ray Regalia 467.5; 2. C. L. Bussard 406.0; *Exhibition Scale—1.* R. E. Finn 365; 2. M. D. Avery 310; *24-Lap Scale Speed Class AB—1.* R. W. McReynolds 1:10.6; 2. Ray Regalia 1:15.9; *Class CD—1.* M. Severson 1:21.7; 2. G. Spurgin 1:24.1; *Goodyear Speed Event*—Roy Mays; *Women's Event*—Mrs. Ilse Favre 92; *Robbers Challenge Trophy Event*—Jeannette and William Rice 309; and *Testor's Beauty Plaque*—Ray Regalia.

All the boys on the West Coast are getting ready for the Las Vegas, Nevada, U-Control meet, October 15 and 16. We don't want anyone to miss it—remember, *free* accommodations and Bar-B-Q for *contestants!* Hope we see some of the Texas gang there.



The Old Master, Frank Cummings, in action at a recent rubber meet

FLASH!

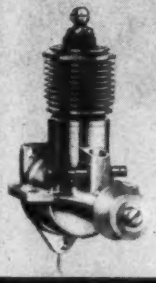
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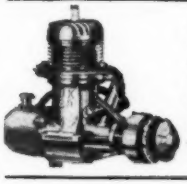


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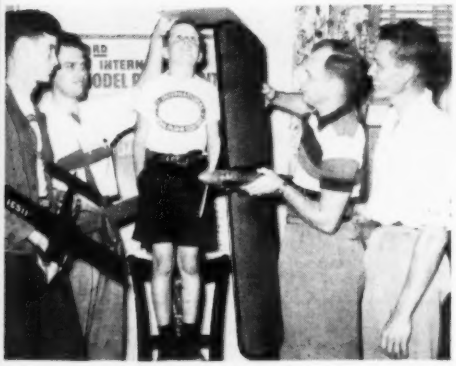
3rd from left, Girls High Pointer, Sylvia Lanzo; 6th is B Novice Speed winner, Sara Mitchener



A little fast action! Modeler launching plane didn't see two boys walking in front—they didn't notice his launching. The inevitable result was *splinters*

Plymouth Third International

by ED YULKE



Bill Blood, Jr., in center, is checked for size against the large stunt ship which he flew



L to R are Vincent Burton, Karl Spielmaker, and Dave Baker, at Indoor Event

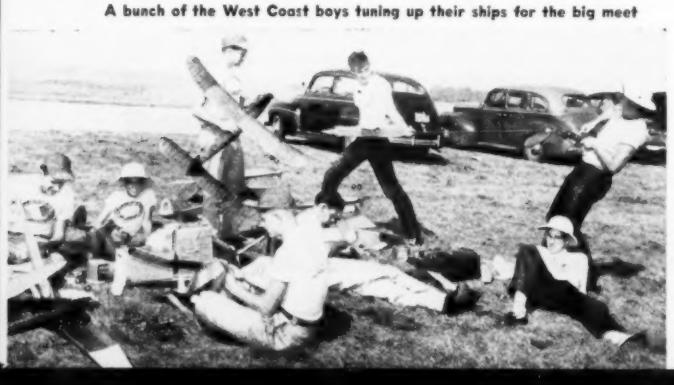


Famed Portland (Oregon) fliers are Dan Hudspeth, Jack, 14, and Mrs. Hudspeth

TAKE 500 contestants from all over the U. S., Canada, Alaska, and Hawaii, distribute them over the 50 events at the Third Plymouth International Model Plane Meet, and you have a pattern for the smoothest run contest we've seen to date. Detroit, from Selfridge Field, where the free-flight events were flown, through the State Fair Coliseum where indoor models floated lazily around, to the fields of Belle Isle, where blatting jets and screaming speed jobs set new records, all was geared for only one purpose from the 22nd to the 29th of August . . . model airplanes and their owners.

The Hotel Fort Shelby, scene of Nationals Contest Headquarters in years gone by, can best be described as a constant stream of models and modelers from morning till night, through the night again until morning—all week. The parking lot across the street from the Fort Shelby quickly became a testing area for models, and far into the night under the lights of the lot all sorts of models were tested, with the police just looking on and shaking their heads, wondering.

A bunch of the West Coast boys tuning up their ships for the big meet



Registration took up most of Monday, August 22, except for the evening when a Contestants' Meeting was held that removed all doubt as to just how the Meet was being run. The fellows left this meeting with a clear picture of what they must do to compete in any event. After the meeting, the parking lot proved a bit inadequate for testing free flight ships, but it proved ideal for hand gliders; rubber models and gliders predominated the scene that night, but the best was yet to come.

Jim Walker, grandpappy of controline flying, arrived as usual with a carload of A-J Gliders and rubber powered *Hornets*. From that point on discussion was evenly distributed between comparisons of the times made on the field during the day—and who got the best time out of an A-J *Interceptor* or *Hornet* over in the parking lot the night before. By the end of the week, there was a *Hornet* with its prop removed and a new *Jetex 50* installed, that flew consistently over ten stories high to land on the roof of the Fort Shelby wing. The police were really puzzled by the swoosh of the *Jetex* . . . even after they had inspected it at close range.

Tuesday, at Selfridge, was close to being that "ideal flying weather" all modelers talk about but seldom admit seeing. Hot sun on the concrete runways provided thermals galore. In Class A-B combined for Novices only, the younger fellows



Jim Walker shows the crowd fine points of a float job. He later did some great flying with it on a nearby pond



Lt. Harry Vogler, of the Air Force, congratulates Tom Baker who had just established a World Jet Record (F. A. I. rules) of 144.83 mph



Minneapolis fliers Ken Bentz, Bob Thor, Dick Olwin, Don Black, Ray Lagermeier, and John Belter



A new Davey Slagle? This is the 2nd Place Novice Stunt winner Fred Sage, III



William Roller, of Cincinnati, Ohio, shows his wife some of the good points of his speed job



Part of the contingent sent to the meet by Plymouth dealers of Georgia



Joe Lee Patterson is teaching brothers Danny and Wayne the tricks of modeling



Pauline and George Newberry, Jim Hice, Ted Pullum, and John Hice, all from Flint, Mich.

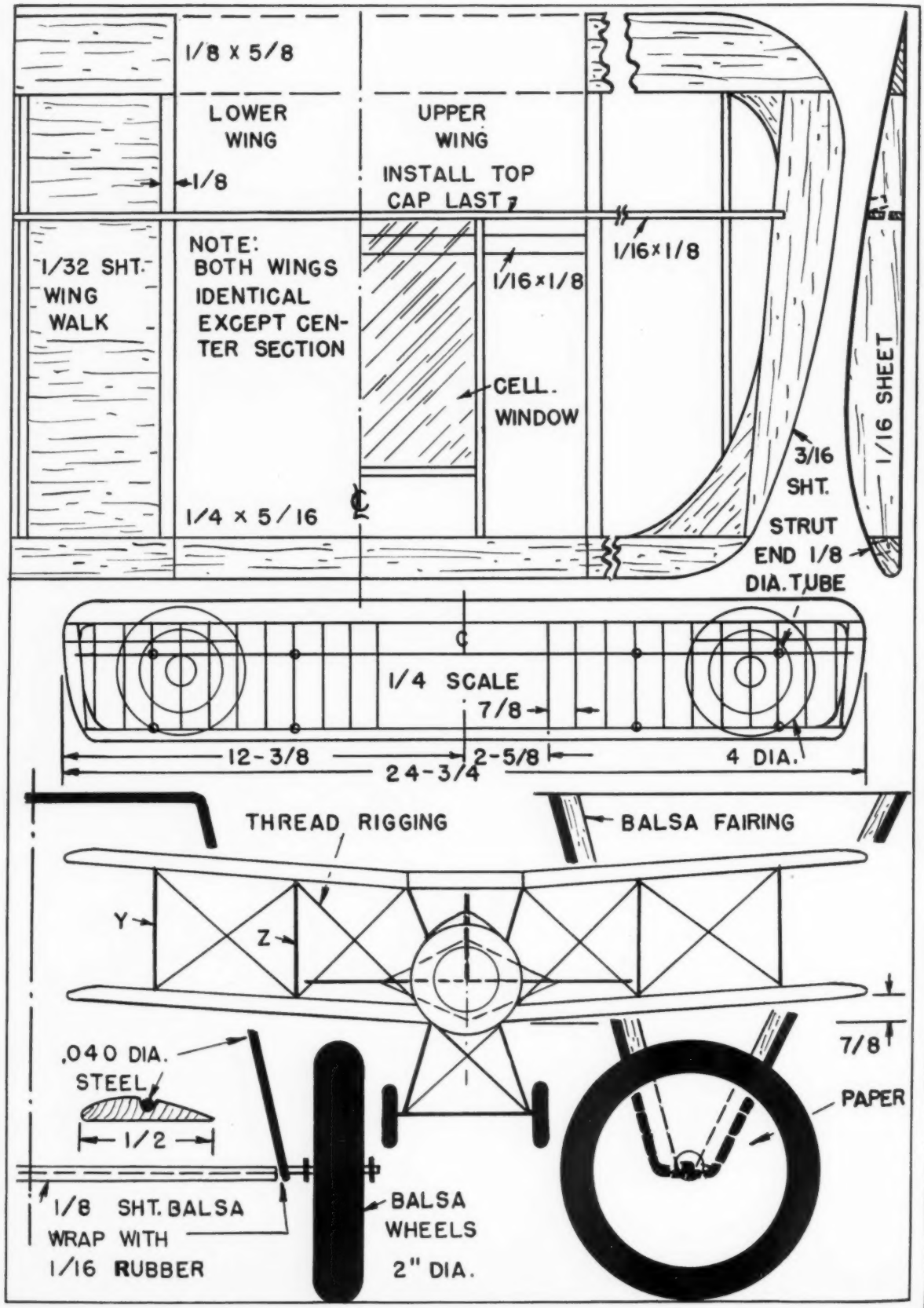
racked up better time than the more experienced fellows. Bill Ramsey of Clearwater, Fla., totaled 1018.8 secs. for three flights and in the Junior section of Class A, Joe Stadelman, of Pittsburgh, Pa., made 1113.2 secs. for three trips up—these compared to an average of 700-900 secs. for three flights among the best of the Senior and Open boys. Class C, flown on the same day, proved to belong to the older fellows, however, with Dave Wilson of Ft. Worth, Texas, doing 1557.6 total.

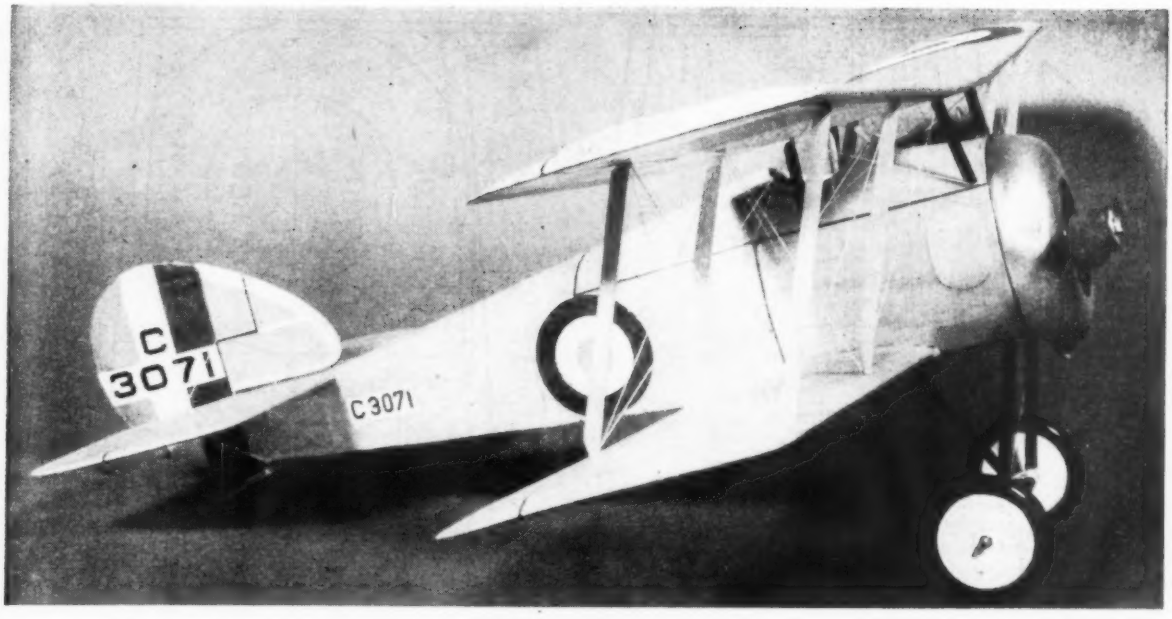
Wednesday, again at Selfridge, saw Class B together with the Class D sky-giants in the air at the same time. The same observation as at the Nationals in Olathe applies here . . . the bigger they get, the harder they hit. Some of the larger Class D jobs almost caused the crash-wagons to roll from the hangers! When will the boys learn that that last ounce of power won't bring a thermal down to the concrete where the pieces are scattered? Times in Class B and D were lower than those racked up Tuesday due to a natural reason—the modelers were quick to explain that when the wind blows, the thermals lean over, and the models have a tough time leaning with them! Frank Stewart, of Marietta, Ga., picked up 928.4 secs. for top in Class B, giving the honors to the Senior Group. He was closely followed by George Hays, of Independence, Mo., with 911.0, but there the real competition ceased abruptly. The rest of the flights in Class B were down around 700 secs. In Class D, Jim Ripken, of Baltimore, Md., took top honors with 995.4 secs., followed by a fairly smooth drop of times down the line to around 700 secs. for third places in the various age groups.

While the gas boys were screaming either up or down (or both), the special Novice towline glider event was being run. There's something quiet and peaceful about the way the towlines soar up on 200' of line, drop off, and wend their way around the field, sniffing for thermals. Times were all fairly even with Steve Renovich, of Detroit, taking first with 567.6 secs. On Wednesday, the "just-one-more-turn" boys brought their rubber motors out of kool-storage, slipped them into models and proceeded to do just that—give them one more turn with the usual result of a few slightly crumpled models with untamed snakes in the wreckage. Somebody should outlaw winders for rubber models, they break more ships up than the wind does! In Outdoor Cabin and Stick events, the older fellows vindicated themselves with Tony (*Turn to page* 34)

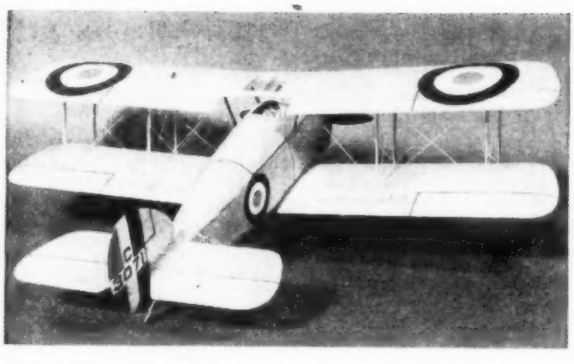
Joe Haas, of Baltimore, competing for top honors at the Plymouth Meet!




1/8 X 5/8
LOWER WING
UPPER WING
INSTALL TOP CAP LAST
1/8
1/32 SHT. WING WALK
NOTE: BOTH WINGS IDENTICAL EXCEPT CENTER SECTION
1/16×1/8
1/16×1/8
CELL. WINDOW
1/16 SHEET
3/16 SHT. STRUT END 1/8 DIA. TUBE
1/4 × 5/16
1/4 SCALE
7/8
12-3/8
2-5/8
4 DIA.
24-3/4
THREAD RIGGING
BALSA FAIRING
Y
Z
.040 DIA. STEEL
1/2
7/8
PAPER
1/8 SHT. BALSA WRAP WITH 1/16 RUBBER
BALSA WHEELS 2" DIA.



Sopwith Snipe





by DICK EALY

THE Royal Air Force was created April 1, 1918, by a merger of the old R. F. C. and R. N. A. S. They were quite concerned over the rising quality of German aircraft and the employment of circus tactics by the Germans. The Sopwith *Camel* and S. E. 5's were inadequate to meet the new Fokker D-VII, and air superiority was passing back to the enemy. The R. A. F. fought on because they knew that newer and better fighters were coming. The best two ships in service test were the Sopwith *Snipe* and the *Dolphin*.

The *Snipe* was capable of 140 mph and was accepted in March, 1918. The *Snipe* scored sensational victories in the closing months of the war.

Our model is built to 7/8″ = 1′ scale and is powered by the new .049 *O. K. Cub* engine. Wing span is 24-1/2″ and the length is 16-1/2″.

Make the fuselage first. Lay out the sides using 1/8″ square hard balsa for the longerons and 1/8″ x 1/16″ balsa for vertical braces. Place the cross pieces as shown in top view from station A to D. When cement is dry, pull sides together and cement at rear end. Add remaining cross pieces.

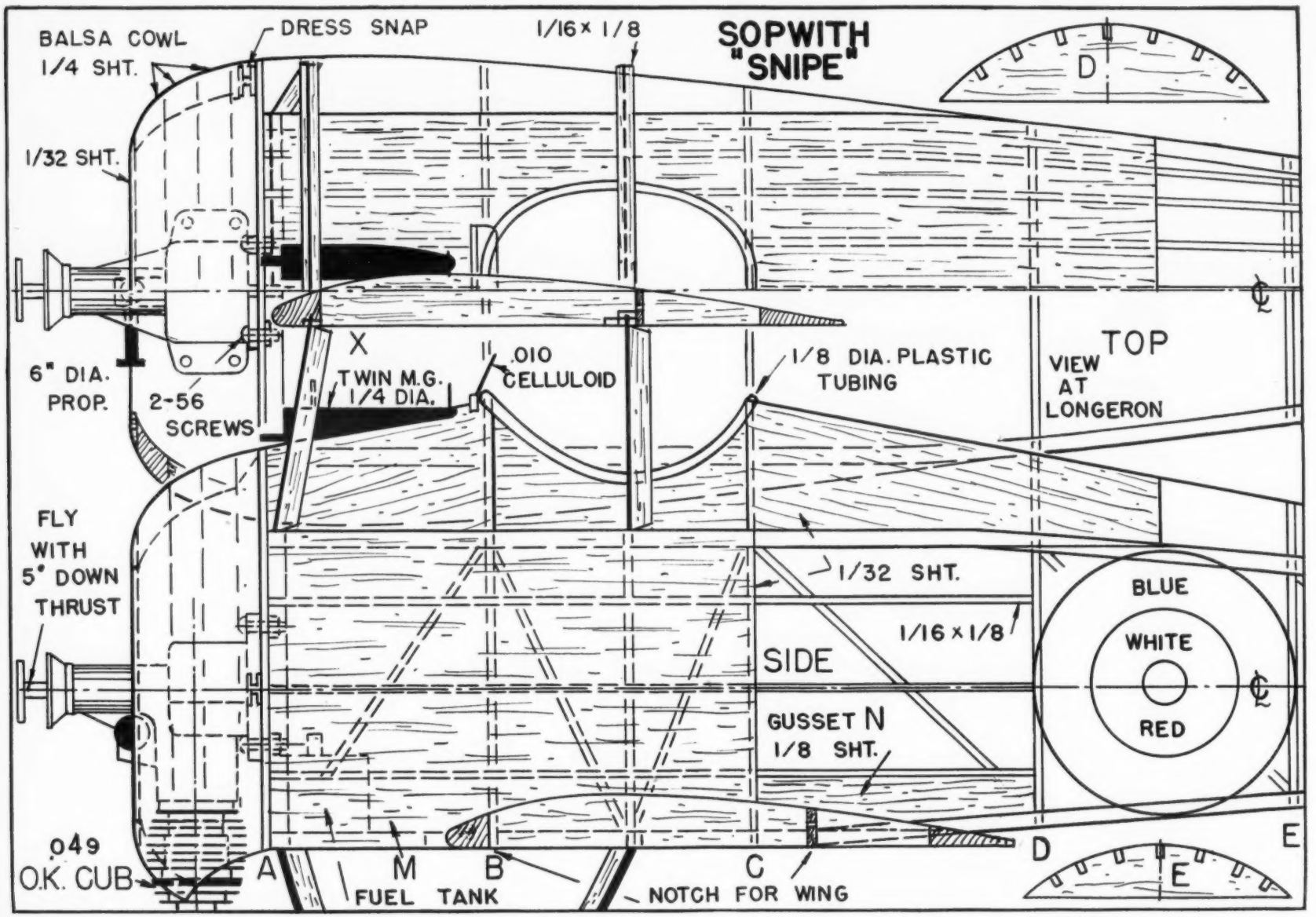
The landing gear should be made from .040″ steel wire and wrapped with button hole thread to fuselage. When this has been done make the 1/16″ plywood firewall and cement into place.

The center wing struts for the upper wing are made from 1/32″ diameter steel wire with balsa fairings. Wrap with thread. Cut out formers from 1/16″ sheet and cement in place. Use 1/32″ sheet to cover sides of fuselage, back to station C. The top of fuselage is covered with 1/32″ sheet balsa to a point midway between A and D. Finish turtle deck with 1/16″ x 1/8″ stringers. Then cover fuselage with yellow Jap tissue. Shrink with water, and apply three coats clear dope.

Make the tail surface and rudder as shown on the plans, and cover with Jap tissue. Shrink with water and apply two thin coats of clear dope. Install tail with zero degrees incidence. Add rudder and bamboo tail skid.

Both upper and lower wings are identical except for the center section, as shown. The leading edge of the lower wing is slit diagonally to slide over rear landing gear strut, and then is cemented together. Cut notches in bottom of fuselage to install lower wing. See detail "X" for mounting upper wing. Cover wings with yellow Jap tissue and shrink with water. Brush on three coats thin clear dope. Install struts and sew rigging through base of struts.

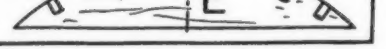
Mount the *O. K. Cub* .049 glow plug engine. The balsa engine cowl is made last. Cement dress snaps in place on the cowl and fuselage for attachment. Paint the finished cowl silver. Be sure to use downthrust for flying. Use washers behind motor for adjustment. The model should be hand-glided before flying with power. Total weight is 6 oz. with the *Cub*. The model can also be flown with *O. K. CO2* power, with rubber power, or finished up as a nonflying display job.


SOPWITH
"SNIPE"
BALSA COWL
1/4 SHT.
DRESS SNAP
1/16 × 1/8
1/32 SHT.
6" DIA.
PROP.
2-56
SCREWS
X
TWIN M.G.
1/4 DIA.
.010
CELLULOID
1/8 DIA. PLASTIC
TUBING
TOP
VIEW
AT
LONGERON
FLY
WITH
5° DOWN
THRUST
1/32 SHT.
1/16 × 1/8
SIDE
BLUE
WHITE
RED
GUSSET N
1/8 SHT.
.049
O.K. CUB
A
M
B
C
D
E
FUEL TANK
NOTCH FOR WING

O.K. CUB

FUEL TANK

NOTCH FOR WING



DESIGNED BY DICK EALY

BUILT BY ED BANTA

1/8 x 1/4

1/16 x 1/8

℄

1/8 SQ.

1/8 SHT.

BLUE

RED

1/32 D. STEEL

1/8 x 1/4

WHITE CROSS

ENGINE HOLES

3/32 DIA.

1/8 x 1/16

1/8 SHT.

A

B

C

M

N

1/16 x 1/8 BAMBOO SKID

1/8 SQ.

F

ALL FORMERS 1/16 SHT.

F

Z

STRUT Y

1/16 x 1/4 PINE

FIRE WALL 1/16 PLYWD



Lidgard holding, Naudzius worrying, Tangney winding: Naudzius's model



Fletcher and Ed ("The Shirt") Lidgard busy "winning the Wakefields"



Italian team member holds team mate G. Cellini's model



Jim Tangney (right) was proxy flier for Australian builder Lim Joon

Wakefield Impressions

by **BOB HANFORD**

THE adventures of the United States 1949 Wakefield team are just fond memories to us now, but this is one chapter of our model building days we will always treasure.

As usual, there was the last-minute scramble to arrange for passports, inoculation certificates, and the little details that always plague Wakefield team members. As soon as we hit New York, however, the confusion ceased to exist.

Ed Naudzius was the luckiest of the team members. He was sponsored by the



Andy Petersen looks for timer; Lidgard helps hold model down against wind



Exuberant Scandinavian fliers toss winner Aarne Elilla



Ellila holding the top place model



Jim Tangney adjusts model he proxy-flew



Typical design used by French and Swiss fliers



Mme. Odette Pini, only woman contestant



Warren Fletcher with 3rd place winner



Frank Zaic explains a subtle joke

Plymouth dealers of the greater Detroit area, who covered all his expenses except from New York to London and back. They would have taken care of this, too, but the AMA had already arranged for that part of the trip.

Joe Boyle was well provided for by the Hampton, Virginia Jr. Chamber of Commerce. The rest of us had to scrounge and scrape on our own. I picked up my airline ticket to New York two hours before the flight took off. The DC-4 in which I was flying blew a supercharger in Chicago, and as a result I missed the send-off luncheon given in the team's honor by the U. S. Rubber Company. Many dignitaries of the U. S. Rubber Company and men familiar to all of the model industry were present to give the team a rousing send-off. I still can't decide whether the luncheon was to wish the team good luck, or out of sheer happiness to be rid of six crazy modelers for two weeks.

Jack Malpass, also of U.S. Rubber, saw five of the team off on a Pan American *Stratocruiser,* and then waited around till Hanford arrived. In the meantime he had booked passage for me on a flight later in the evening. The entire team wants me to express written thanks to Jack for his unselfish efforts to get us off to England.

Even though I took a much later flight, the plane I was on landed at London Airport only about ten minutes later than the rest of the team. In the customs office we met Frank Zaic, our esteemed manager, and Percy Chorley, the AMA representative in England. To Percy we owe an undying debt of gratitude for finding hotel accommodations in London in the middle of England's holiday season, and for all the little details he handled for us. We went from customs to our hotel, dropped off our luggage and planes, then "Uncle Frank" Zaic took us on a tour of London. If you think American auto drivers are crazy, you should see the London taxi drivers frighten pedestrians to death! It was really tough on us for the first few hours when we tried to cross streets. We would look up a street in the direction cars come from in the States, and then almost be flattened by a horde of cars coming in the opposite direction. It took some time for us to learn that the British drive on the *left-hand* side of the street!

The afternoon of the next day we went to the S.M.A.E. headquarters at Londonderry House where we balanced tea cups and cake and met most of the other teams and people connected with the contest. About six in the evening we were packed into buses and taken to Cranfield Aerodrome, about 70 miles from London. Then the fun began. We took our ships up to our rooms, dumped our luggage, and the entire team congregated in Joe Boyle's room to unpack his ships. And so we went from room to room unpacking all our ships, assembling them, and looking over the other fellow's designs. It went something like this:

First fellow: "Say, that's really a nice job. I like the design."

Second fellow: "Yes? Thanks."

First fellow: (To himself) "I wouldn't be seen dead with that ship."

The next morning at six ayem, Ed Naudzius poked his head into my room and woke me up to go test flying. While Ed washed, I awakened Joe Boyle and Junior Fletcher. Since Warren Fletcher was the youngest member of the team, he was officially christened "Junior." Naudzius tried to pry Lidgard loose from bed, with no success. Somehow we completely forgot about Andy Peterson. It was nice and calm until about eight in the morning, and then the hurricane that the

(*Turn to page* 50)



Winner Ellila with famed Wakefield Trophy

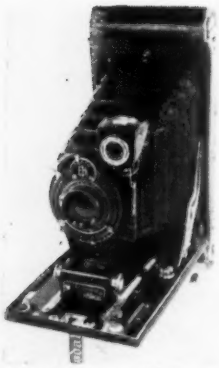


Fig. 1 30 year old camera gives fine results

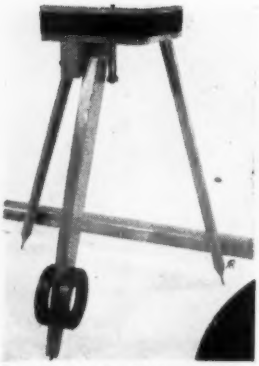


Fig. 2 Part 2 will describe how to make this sturdy simple tripod

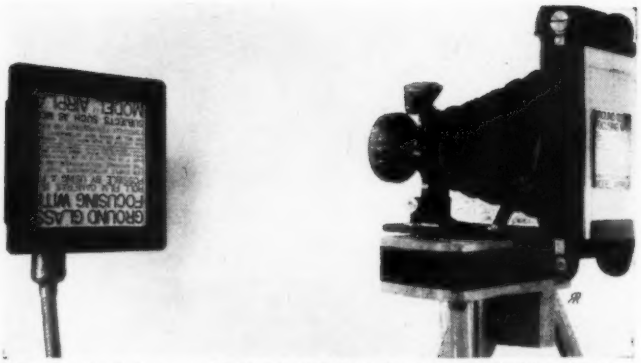


Fig. 3 Also to be covered in Part 2 of Photo Series, is a method of focusing by calculation from a chart. Set-up shown here is used to work out the chart

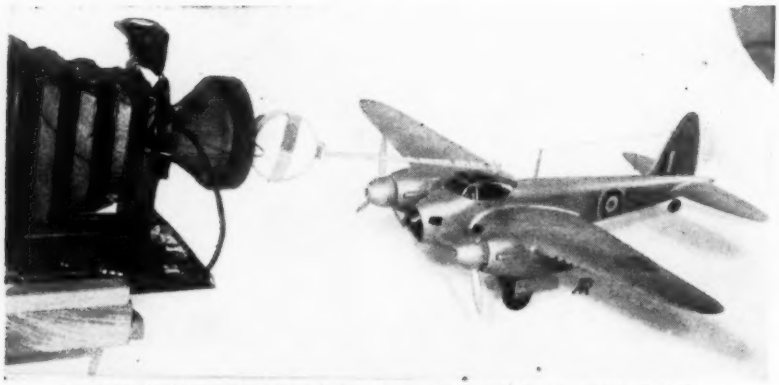


Fig. 4 "Built-in measuring tape" facilitates measuring from lens to model (Part 2)

Model Portraiture

PART ONE

MOST aeromodelers will derive much enjoyment from a collection of "portraits" of the models they make. Portraits serve as a recorded history of their modeling achievements, and many of the pictures will still be available for future reference long after the original models have been lost or destroyed in actual flying service. Also many "gadgets" made for models are worthy of recording for one reason or another, and after some practice, sufficient skill will be acquired to get real shots that are worth submitting for magazine or book publication.

Good portrait type pictures are possible with cameras in the $8 to $10 class but better yet, a much higher grade but older camera can usually be picked up second hand for $5 to $10. A "fast" lens (low f/ number) is not necessary as slow lens speed can be amply compensated for in still portraiture with longer time exposure, which of course is readily possible with a non-moving subject. At the same time sharper pictures with greater depth of field and less distortion can be secured by using a small stop opening.

Depth of field is desirable in most pictures and a necessity in ultra-close-up photographs, especially if the subject itself has much depth. This is another reason why a small stop opening is recommended. With respect to the term "stop opening," synonymous terms are diaphragm and aperture. The mechanism in most camera lens mounts contains a diaphragm having an adjustable size aper-



Fig. 5 Part 3 gives details of an attachment to hold lenses for close-up work

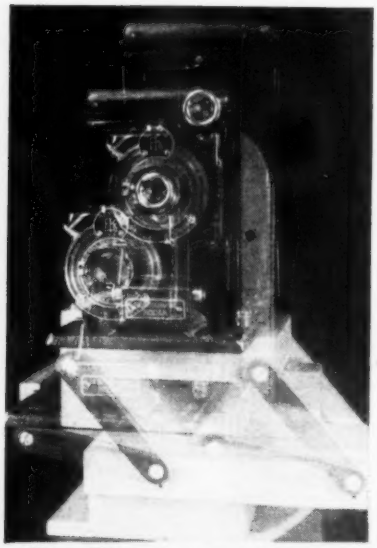


Fig. 6 This double exposure shows swinging camera mount to eliminate parallax

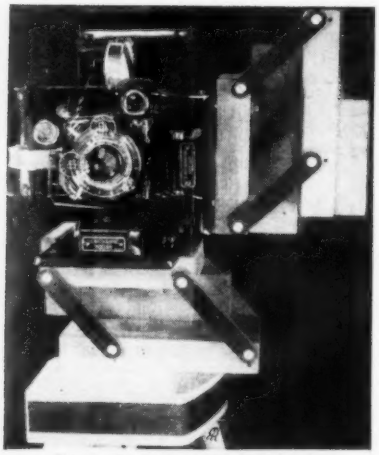


Fig. 7 Swinging mount described in Part 3 can also be used horizontally

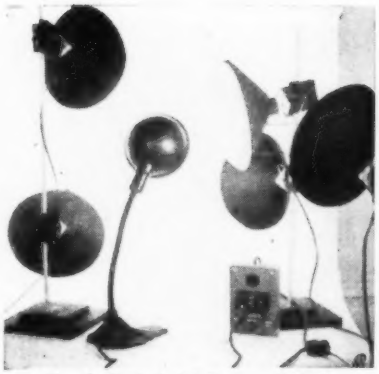


Fig. 8 Part 4 details use of lighting equipment and proper background

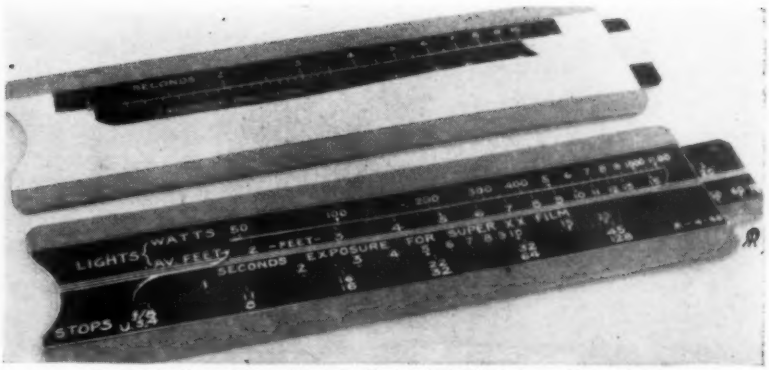


Fig. 9 Another section of Part 4 will give instructions for making and using this simple slide rule so that every shot will result in a perfect exposure

by RAY RUSHER

ture and the full diameter of the lens is seldom used except for fast action and/or when lighting is poor. "Stopping down" means reducing the size of the aperture.

Box, or folding, cameras of the fixed focus type can be used but are not very suitable for sharp pictures because they have only one focusing distance for each lens combination (camera lens alone or in combination with one or more supplemental lenses or "portrait attachments"). Another disadvantage is that they usually have a single lens cell such as an ordinary meniscus (concave on the film side and convex on the subject side) or an achromatic meniscus with the stop either in front of or behind the lens. This causes *barrel* distortion in the first case and *cushion* distortion in the second case. *Barrel* distortion makes any lines of the subject bow outwardly from the center of the picture and *cushion* distortion makes them bow inwardly. Both types of distortion are undesirable for pictures of those models which have straight lines.

An ordinary meniscus lens focuses the different colors at different points, so that a subject that has color produces a picture that is blurred in parts. An achromatic meniscus lens is a lens cell composed of two lens elements of the proper shape cemented together to correct for color. It is therefore the better of the two lenses for taking pictures of colored subjects.

At least a rapid rectilinear lens assembly is recommended, however, as it corrects for barrel and cushion distortion by having two lens cells with the diaphragm located between them, both cells being achromats so they are corrected for color. The best present day lenses, of course, are the anastigmats which are fast lenses similar to the rapid rectilinears but superior to them.

Anastigmats are additionally corrected for astigmatism which is a fault or "aberration" of lenses resulting from distortion of the rays of light passing through the lens at an angle. This angle and therefore the distortion increases as the edge of the lens is approached. Considering this fact it will be obvious why a small stop opening is recommended for the meniscus, achromatic meniscus and, though less so, the rapid rectilinear lenses. A smaller stop opening permits use of only the central part of the lens which part produces the least distortion but since the small opening admits less light, exposure time must be increased to permit sufficient light to get to the film so that it is not under-exposed. When the lens is stopped down it takes an expert to distinguish much difference between a still portrait taken with an anastigmat and one taken with a rapid rectilinear.

The anastigmat has an important advantage, however, and that is it need not be stopped down as much as the slower lenses and details of the subject are therefore clearer providing there is sufficient depth of field at the larger stop setting used for the subject being photographed. To secure maximum clarity in your pictures, the lens should be stopped down only enough to take in the required depth of field. A chart is included nowadays with most new cameras on the market or can be found in several books on photography at most any library and of course as you gain experience, you will eventually be able to judge the correct stop for the depth of field of each subject without reference to charts.

A bellows or adjustable length lens tube focusing type of camera is a necessity to cover the range you will need for a complete line of model portraits. The shutter should have at least a time (**T**) adjustment and preferably also a bulb (**B**) adjustment in addition to the usual snapshot adjustments

(*Turn to page* 49)

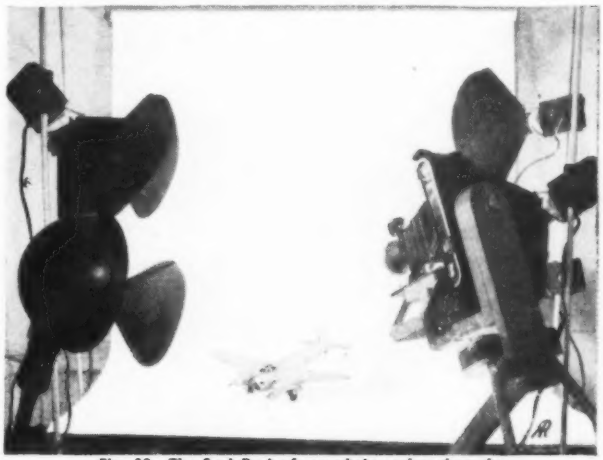


Fig. 10 The final Part of our photo series gives details for taking your models' portrait, as shown here



Fig. 11 This picture shows the results obtained with the setup in Fig. 10. Note how model stands out from background

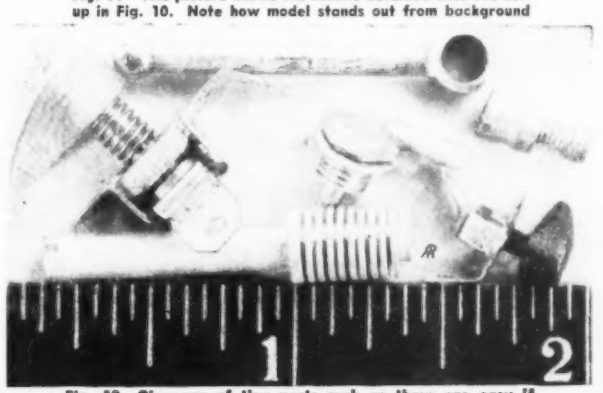
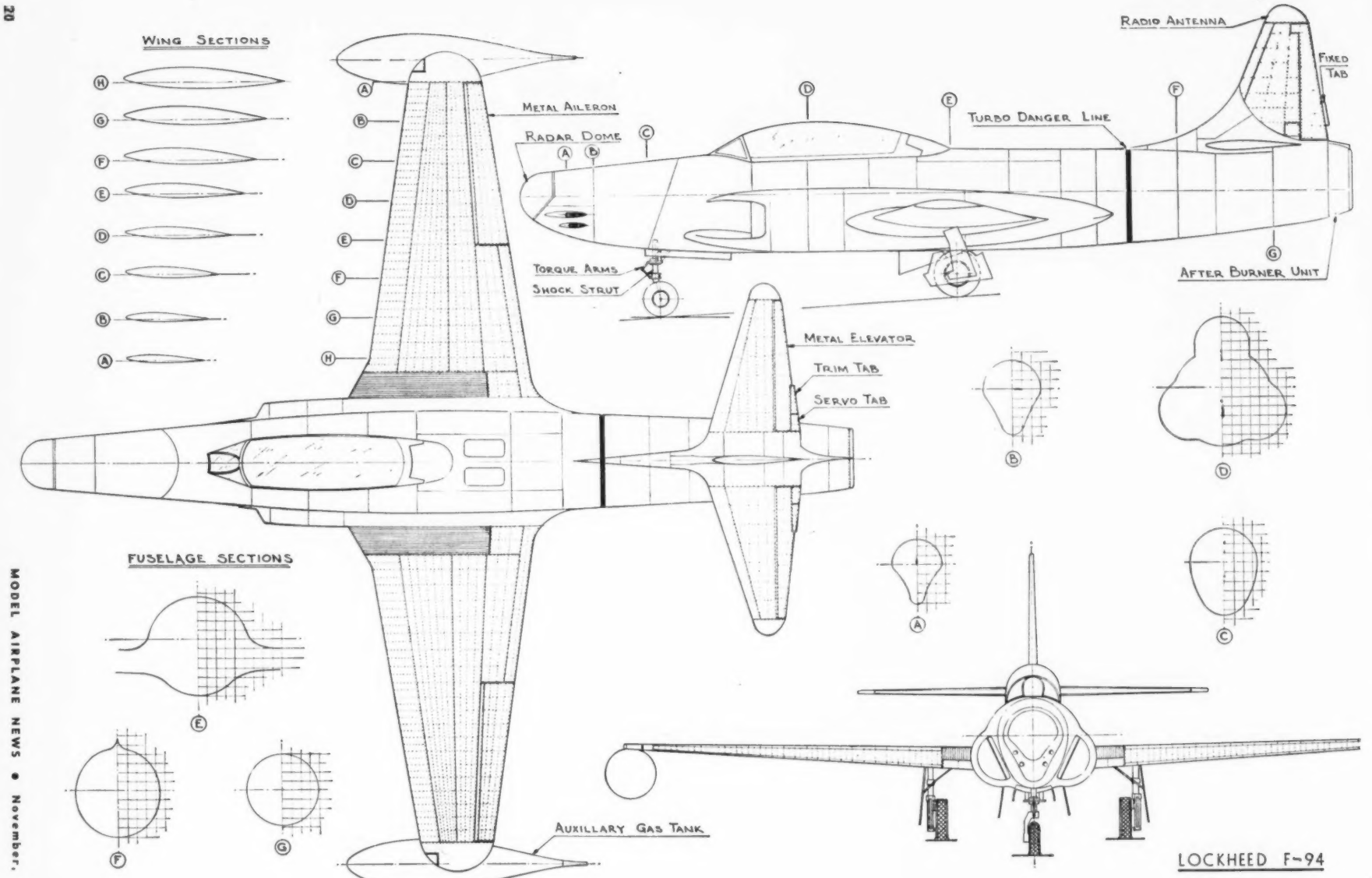


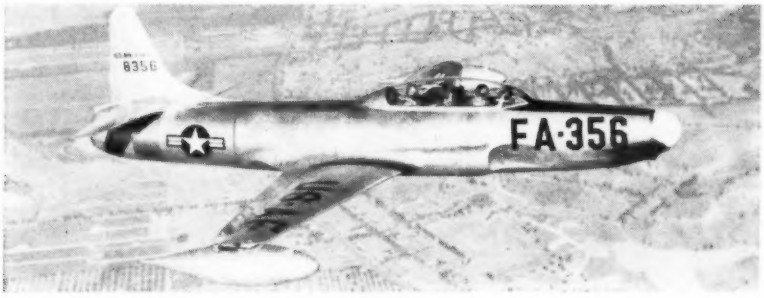
Fig. 12 Close-ups of tiny parts such as these are easy if you follow the instructions included in this photographic series


WING SECTIONS
RADIO ANTENNA
FIXED TAB
METAL AILERON
RADAR DOME
TURBO DANGER LINE
TORQUE ARMS
SHOCK STRUT
AFTER BURNER UNIT
METAL ELEVATOR
TRIM TAB
SERVO TAB
FUSELAGE SECTIONS
AUXILLARY GAS TANK
LOCKHEED F-94
DRAWN BY - LEONARD WIECZOREK

DRAWN BY · LEONARD WIECZOREK



Lockheed F-94



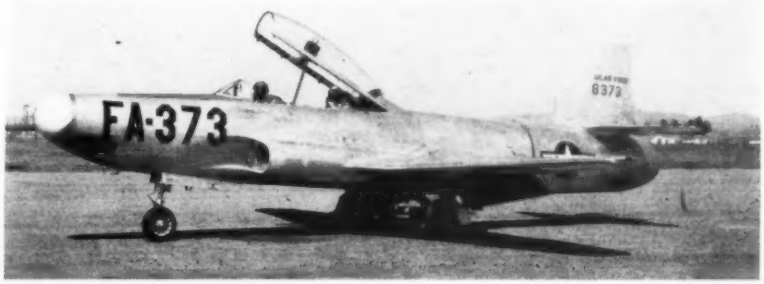
by ROBERT McLARREN

IT WAS the desert but it was cold—bitterly cold. The small group of engineers, mechanics, and technicians huddled around the mysterious airplane, glancing anxiously to the East. The sun was already well up but it gave no heat to the group at the secret testing base at Muroc Lake, Calif., which had not yet been dignified by an official name. Slowly the desert began to absorb the rays from the sun and the secret British DeHavilland-Halford *Goblin* turbojet engine was started. Test pilot Milo Burcham, former air race stunt pilot, climbed into the tight-fitting cockpit, waved a signal and the Lockheed XP-80 moved across the desert sand and soared into the air on its first test flight. The date was January 8, 1944, well over five years ago. Test pilot Burcham is now dead and the imported *Goblin* engine hasn't been used in a U.S. airplane since that day. But from that humble beginning has come a veritable armada of Lockheed *Shooting Star* jet fighters—more than 1,000 of them—in a variety of models, forms, and configurations.

The invasion on Normandy Beach was still five months away and assault task forces were just being formed for the attack on Kwajalein and Eniwetok in the Marshalls. Yes, it sounds like a long time ago, but in the history of aviation it was only yesterday for jet propulsion is still "new" in the 46-year-old story of flying. And so the development of the *Shooting Star* from that first test flight at Muroc to the modern two-man F-94 all-weather fighter, our *"Plane of the Month,"* is a remarkable story of speed and engineering progress.

We told you the story of the P-80 in MODEL AIRPLANE NEWS, December, 1945, issue and this month gives us an opportunity to bring the story of this modern miracle up to date. It was comparatively easy to take a war-experienced fighter pilot and turn him into a jet fighter pilot. The process consisted simply of extensive ground school briefing on the airplane, its controls and equipment, its handling characteristics and, above all, the things to watch out for, such as high fuel consumption, a tremendous rate-of-roll and that old demon "black out" if you weren't careful. And so as soon as Lockheed rolled out a new F-80C fighter, for example, a new pilot was usually ready to take charge of the airplane. But experienced wartime fighter pilots quickly drifted from the service, married, started families and got into civilian life. With this ever-diminishing group of pilots, the Air Force was faced with the problem of training student-pilots to fly jet aircraft! One of the first steps was to take a P-80 fighter, bolt it to concrete blocks, and thus create a "captive" jet fighter. The airplane is in full working order, the student operates all of the controls of the flying version and in this device becomes experienced in the operation of a jet engine as installed in the P-80.

But the captive trainer, valuable as it was for engine operation instruction, obviously could not simulate the flying characteristics of the real airplane and this led to the Lockheed TF-80C two-seat jet trainer. Lockheed appointed F. A. Smith project engineer on the new version. He assembled 14 men and on August 25, 1947, this small group took a standard single-seat jet fighter off the production line and seven months later the first TF-80C took off on its first test flight. First step was the addition of a fuselage section 3' 2" long to make room for an additional seat. A huge, single-piece blown canopy was fitted over both of the seats, with hinges at the rear to raise the entire piece upwards for entrance and (*Turn to page* 44)



design forum

by CHARLES H. GRANT

THE most effective way to determine correct features of design is to test them in actual practice. In this way the experimenter can quickly determine their effect, provided he diagnoses the performance of his airplane accurately. There are so many different factors in design which affect flight that it is difficult to put your finger on the one factor which may be causing a particular good or bad reaction. Often it is not merely one factor but a combination of factors that are causing a specific condition. However, though it is difficult even through practical tests to determine the effects of different design features, it is a far better method than trying to merely *study* out the problem or determine the cause of the trouble by reading a wordy answer in some editorial column. Only too often writers cannot, or do not, make the situation clear to the reader because of the limitations and various interpretations of words, your *"Design Forum"* author not excepted.

Therefore, this month we are approaching the problem of design from a practical standpoint and giving you the outline of a little plane that you can build and with which you can make your own test flights. This plane consists of a basic fuselage, or stick, supporting a rubber motor and propeller. At least two different sets of wings and tail planes are required which we will describe as we proceed. The purpose of this model is to provide a means for observing flights with wings, tail planes, fin areas, etc., of certain sizes and in different positions; the experimenter may observe the resulting changes in flight reactions from different combinations or settings of these features.

For instance, suppose we first test a normal correctly proportioned airplane with the wings attached beneath the stick, bringing the thrust line approximately at the center of lift and resistance of the wings. The tail planes also are set in a more or less neutral position; that is, the stabilizer is attached with a rubber band or cement to the stick as shown in Fig. 1, with the fin directly above the stabilizer and contacting the right side of the stick. This little plane will give excellent flights and is a typical sport or practice model.

However, *all* airplanes, especially of the gas-powered variety, should not, for various reasons, be built with this particular set-up. In fact, for contest work where steep and rapid climb is required, another arrangement serves our purpose better. Fig. 1A shows the side view of the airplane. Fig. 1B shows a plan view. Basic measurements are given in both figures. We suggest that you build this little plane using 1/4" square hard balsa stick and wings of 3/64" or 1/16" sheet. This sheet may be creased at the center and a V block cemented in the crease to give it correct dihedral, as indicated in Fig. 1. One or two balsa ribs cemented to the underside of the sheet provide the proper curve or camber to the wing. The tail planes may be made of 3/64" sheet balsa. The fin may be cemented directly to the stabilizer. This whole unit is attached to the rear of the stick with a rubber band so that the stabilizer is beneath the stick and the fin to one side of it. Carve your own propeller for this job from a balsa block (hard), 7" x 1-1/2" x 3/4", using diagonal lines to the corners for cutting guides. The ready-made purchased propeller usually is very inefficient and gives poor results. After building your little plane, fly it and learn its peculiarities, if any. Become familiar with its adjustments so that you will visualize its performance as standard. Then you are ready for our first variation in the set-up of the design. Suppose we place

(*Continued on page* 45)

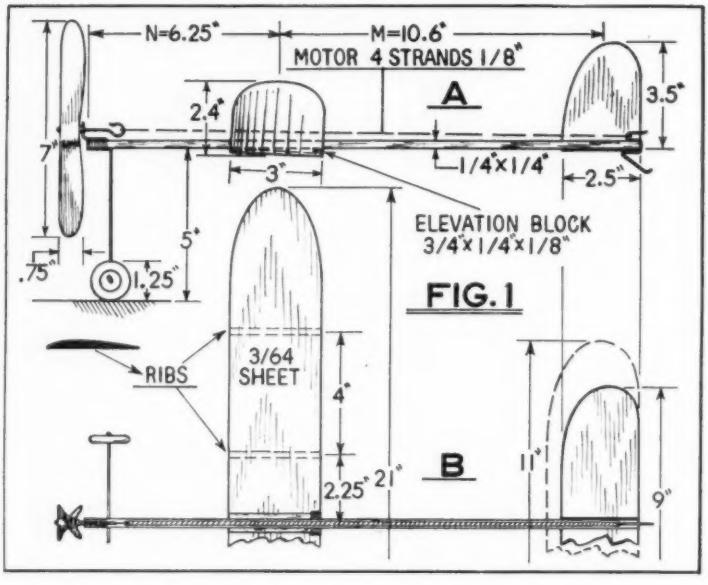


FIG. 1

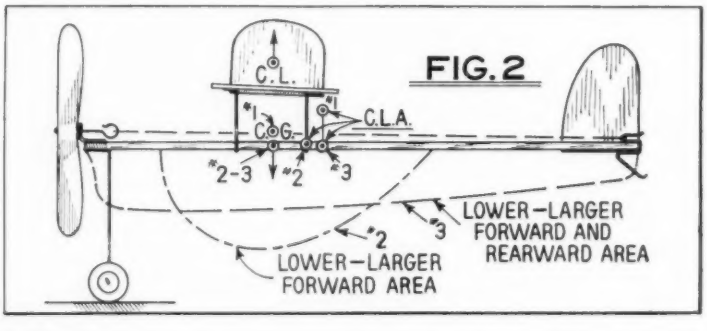


FIG. 2

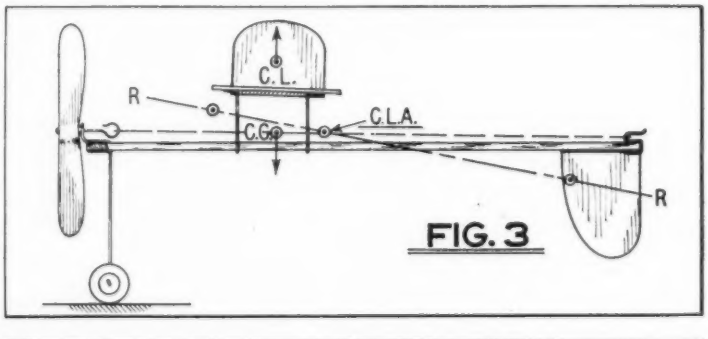


FIG. 3

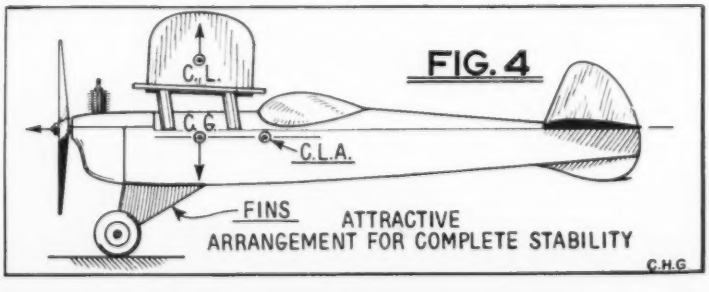
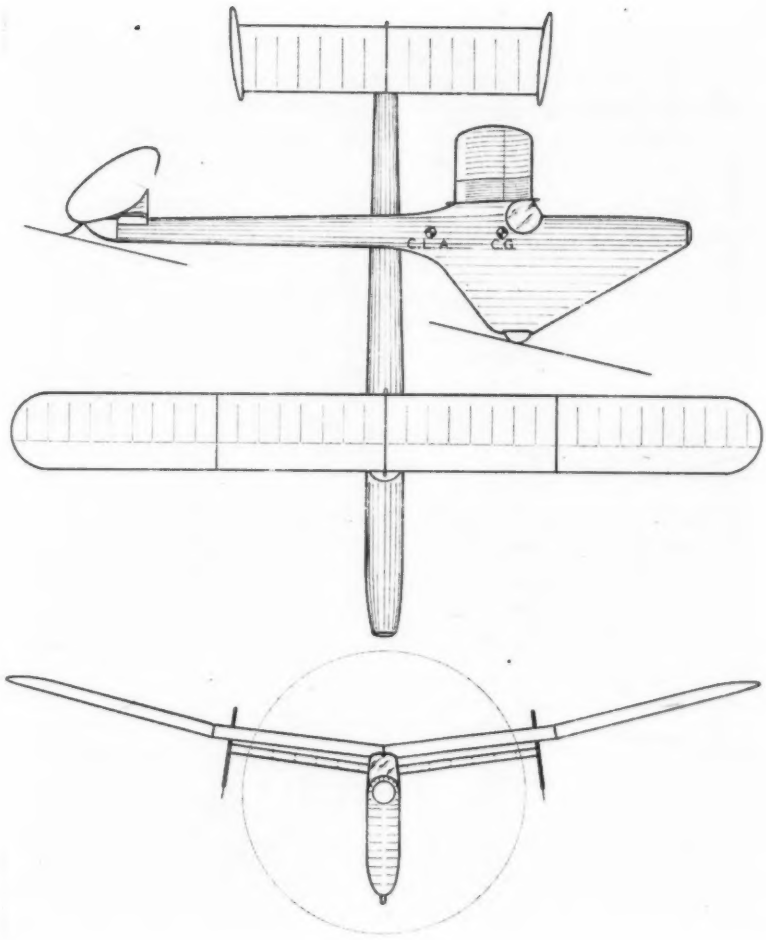


FIG. 4





Stout Snout

by BRUCE WENNERSTROM

FOR consistently good flights, a model plane must possess three qualities: strength, stability, and streamlining. If any of these elements are missing, performance suffers. It is difficult to blend these three requirements into one design since—a strong fuselage is not always streamlined, a streamlined model not always stable.

Stout Snout's design was arrived at as a successful combination of the three factors mentioned. The force set-up approaches perfection. The low C.L.A. guarantees spiral stability while a long stabilizer moment arm, twin rudders mounted at an angle and both wing and stab dihedral give good stability about the three axes. Streamlining is achieved by eliminating virtually all fuselage formers, fairing in the landing gear, using the pod and boom fuselage outline, making cross sectional area the minimum allowed, use of efficient lifting surfaces, and the addition of a folding propeller.

Stout Snout is practically indestructible. The fuselage is built around a spirally wrapped balsa tube, the stringers being cemented right to the tube and covered as usual. The fuselage will easily take the strain of any rubber motor that will fit into it. A well-gusseted and reinforced wing with sheeted leading edge, plus a fly-off mount for both wing and stab, assure that they will stay flyable.

Best of all the ship can be built as light as a conventional streamlined rubber job since the formers, retracting gear mechanism, and long landing gear leg of the conventional fuselage have been eliminated, while 1/32" sheet ribs and soft balsa members keep the flying surfaces light; close spacing of ribs maintains wing efficiency.

Furthermore the unique method of construction has another advantage—it can be built perfectly true without a warp or twist anywhere. The tube is just left on the stick on which it was formed and the outer frame built right around it. The completed structure, still on the stick, is then covered and doped. Then, and only then, is the stick removed and the nose and tail plugs fitted. But while we're discussing fuselage construction, why not get started?

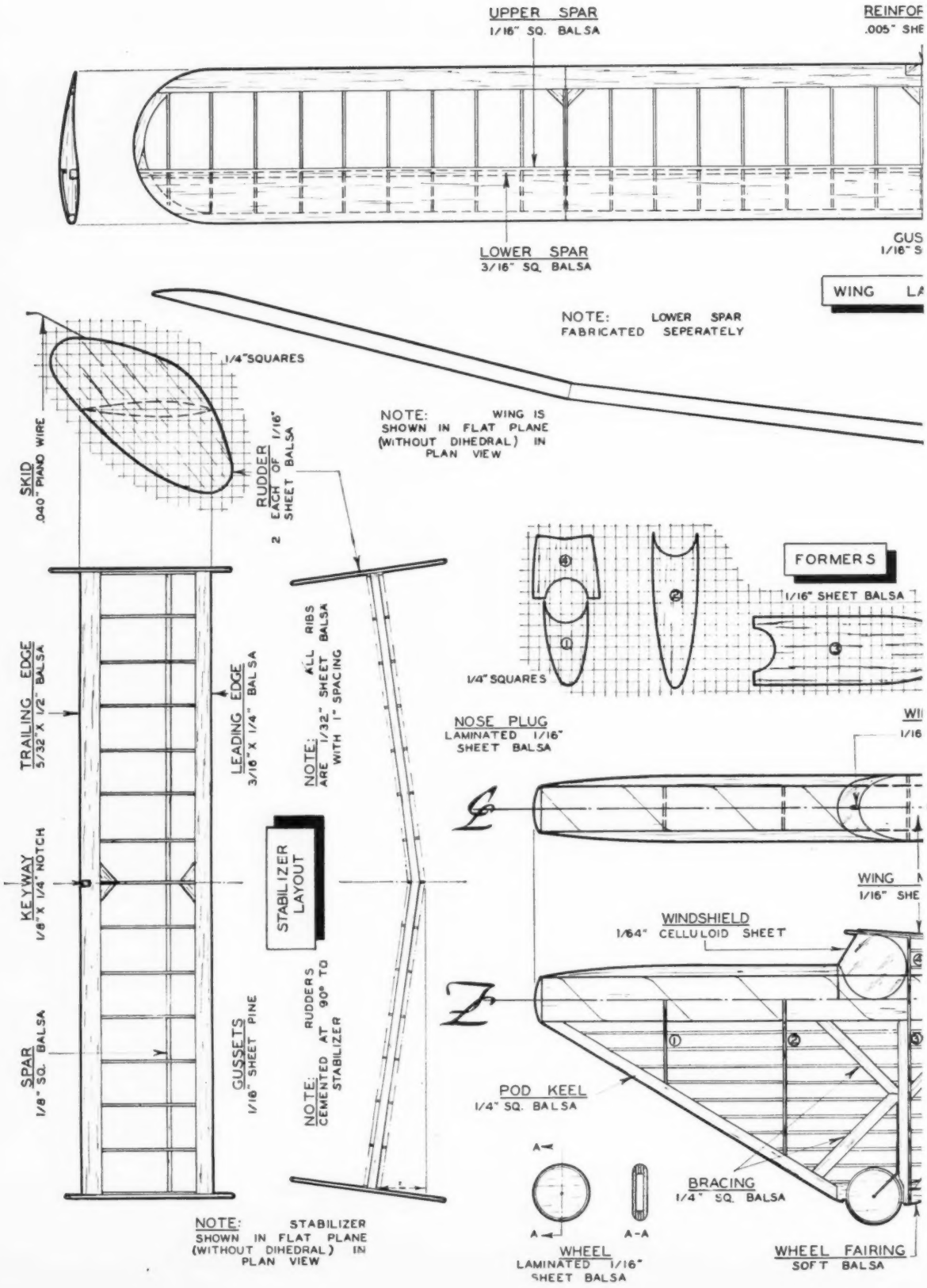
FUSELAGE. The basic tube is built up of a sheet of 1/32" balsa at least 3" wide. Select a sheet carefully; to get the specified tube of 1" diameter requires a sheet about 5/32" oversize. Thumbing through your local hobby dealer's stock should disclose the desired piece. The sheet is then soaked in warm water for about 20 minutes. In the meanwhile locate a broom stick, or mop handle, an inch in diameter and wax it well to prevent the tube from sticking to it. Now curl the tube around the stick and wrap with gauze bandage, then leave it to dry.

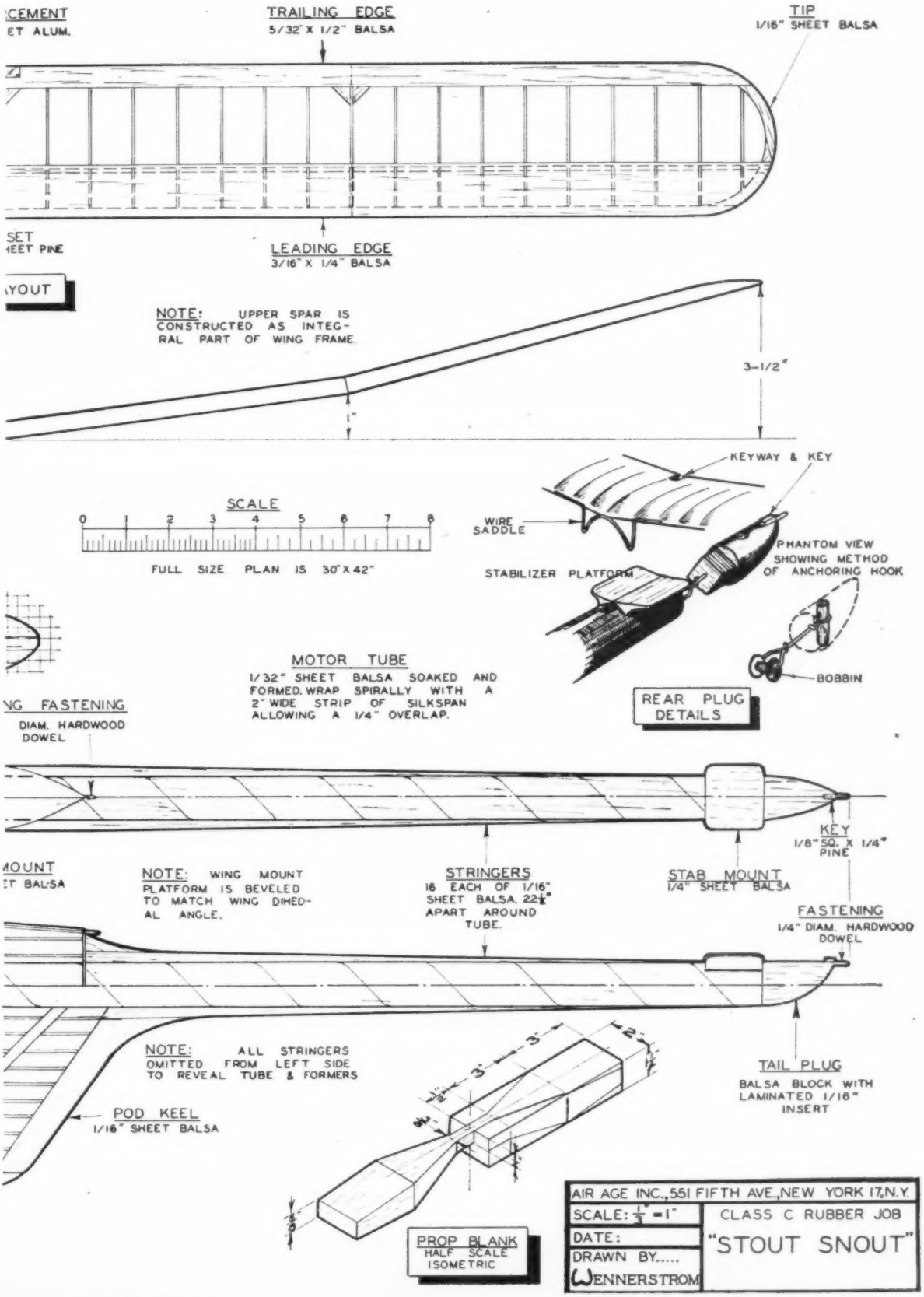
When the tube has dried, remove the bandage and cement the edges of the tube together. Then cut a strip of Silkspan about 2" wide and spirally wrap the tube, doping the paper to the wood. Again, let the tube dry.

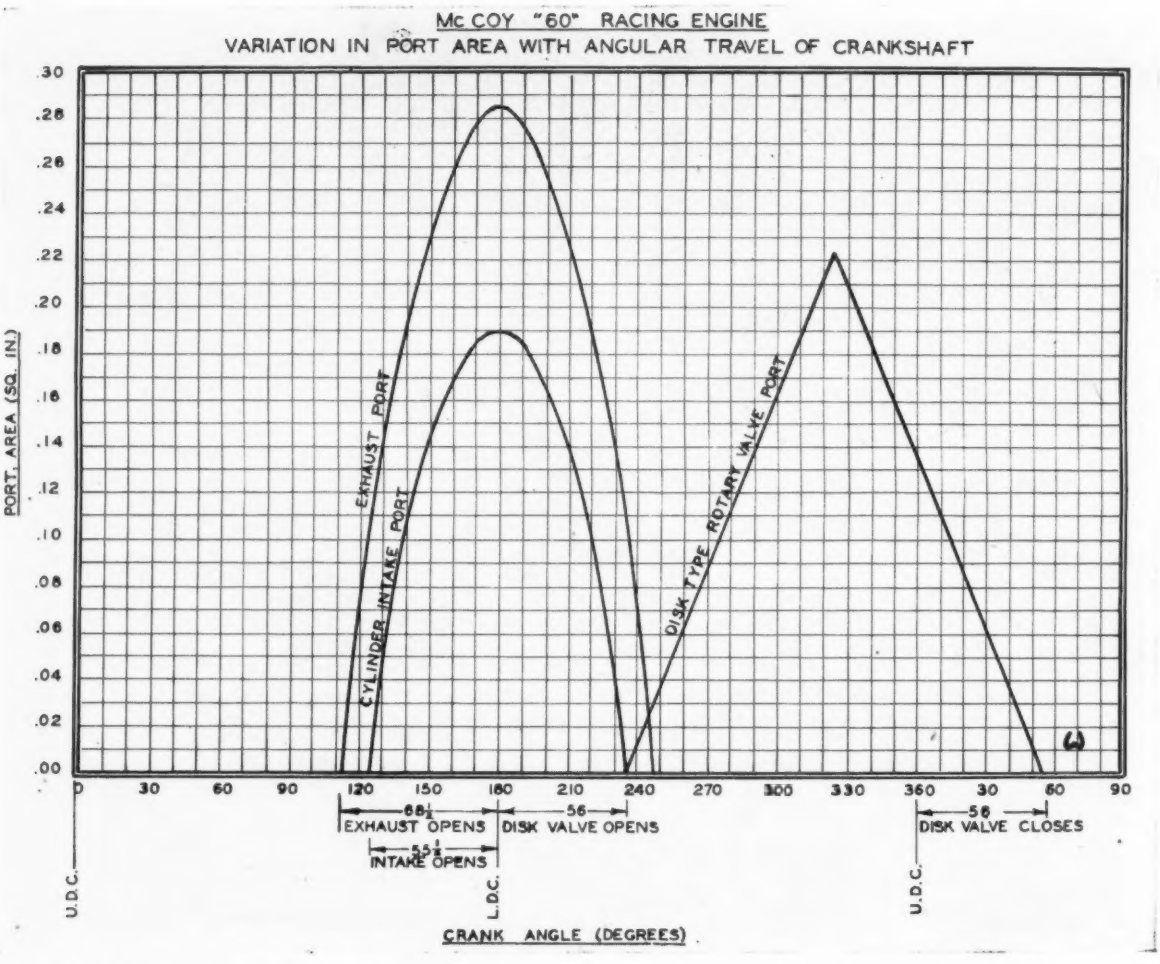
All stringers are cut from 1/16" sheet balsa. There are 16 identical stringers cemented to the tube every 22½° around. The formers are then added and the ¼" sq. bracing cemented in place. Cement the wheel strut in well, using Dupont *Duco*

(*Turn to page* 53)




UPPER SPAR
1/16" SQ. BALSA
REINFOR
.005" SHE
LOWER SPAR
3/16" SQ. BALSA
GUS
1/16" S
WING LA
NOTE: LOWER SPAR FABRICATED SEPERATELY
1/4"SQUARES
NOTE: WING IS SHOWN IN FLAT PLANE (WITHOUT DIHEDRAL) IN PLAN VIEW
SKID
.040" PIANO WIRE
RUDDER
2 EACH OF 1/16" SHEET BALSA
FORMERS
1/16" SHEET BALSA
1/4" SQUARES
TRAILING EDGE
5/32" X 1/2" BALSA
LEADING EDGE
3/16" X 1/4" BALSA
NOTE: ALL RIBS ARE 1/32" SHEET BALSA WITH 1" SPACING
NOSE PLUG
LAMINATED 1/16" SHEET BALSA
KEYWAY
1/8" X 1/4" NOTCH
STABILIZER LAYOUT
WINDSHIELD
1/64" CELLULOID SHEET
SPAR
1/8" SQ. BALSA
GUSSETS
1/16" SHEET PINE
NOTE: RUDDERS CEMENTED AT 90° TO STABILIZER
POD KEEL
1/4" SQ. BALSA
BRACING
1/4" SQ. BALSA
A
A
A-A
WHEEL
LAMINATED 1/16" SHEET BALSA
WHEEL FAIRING
SOFT BALSA
NOTE: STABILIZER SHOWN IN FLAT PLANE (WITHOUT DIHEDRAL) IN PLAN VIEW


CEMENT
ET ALUM.
TRAILING EDGE
5/32" X 1/2" BALSA
TIP
1/16" SHEET BALSA
SET
HEET PINE
LEADING EDGE
3/16" X 1/4" BALSA
AYOUT
NOTE: UPPER SPAR IS CONSTRUCTED AS INTEGRAL PART OF WING FRAME.
3-1/2"
1"
SCALE
0 1 2 3 4 5 6 7 8
FULL SIZE PLAN IS 30"X42"
KEYWAY & KEY
WIRE SADDLE
PHANTOM VIEW SHOWING METHOD OF ANCHORING HOOK
STABILIZER PLATFORM
BOBBIN
REAR PLUG DETAILS
MOTOR TUBE
1/32" SHEET BALSA SOAKED AND FORMED. WRAP SPIRALLY WITH A 2" WIDE STRIP OF SILKSPAN ALLOWING A 1/4" OVERLAP.
NG FASTENING
DIAM. HARDWOOD DOWEL
KEY
1/8" SQ. X 1/4" PINE
MOUNT
ET BALSA
NOTE: WING MOUNT PLATFORM IS BEVELED TO MATCH WING DIHEDRAL ANGLE.
STRINGERS
16 EACH OF 1/16" SHEET BALSA, 22½" APART AROUND TUBE.
STAB MOUNT
1/4" SHEET BALSA
FASTENING
1/4" DIAM. HARDWOOD DOWEL
NOTE: ALL STRINGERS OMITTED FROM LEFT SIDE TO REVEAL TUBE & FORMERS
TAIL PLUG
BALSA BLOCK WITH LAMINATED 1/16" INSERT
POD KEEL
1/16" SHEET BALSA
3"
2½"
3"
PROP BLANK
HALF SCALE
ISOMETRIC
AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.
SCALE: ½ = 1"
DATE:
DRAWN BY..... WENNERSTROM
CLASS C RUBBER JOB
"STOUT SNOUT"



"Hot" Engine Design

IN THE design of racing engines, where the chief objective is maximum output, particular attention must be given to proper portings, port timing, compression ratio, and reduction of reciprocating weight. For high operating speeds, the cylinder intake and exhaust ports should be large, but the amount of port area obtainable is limited by the circumference of the cylinder, which places a limit on port width, and by the port timing, which limits port height, for even in a racing engine the ports cannot be opened too early.

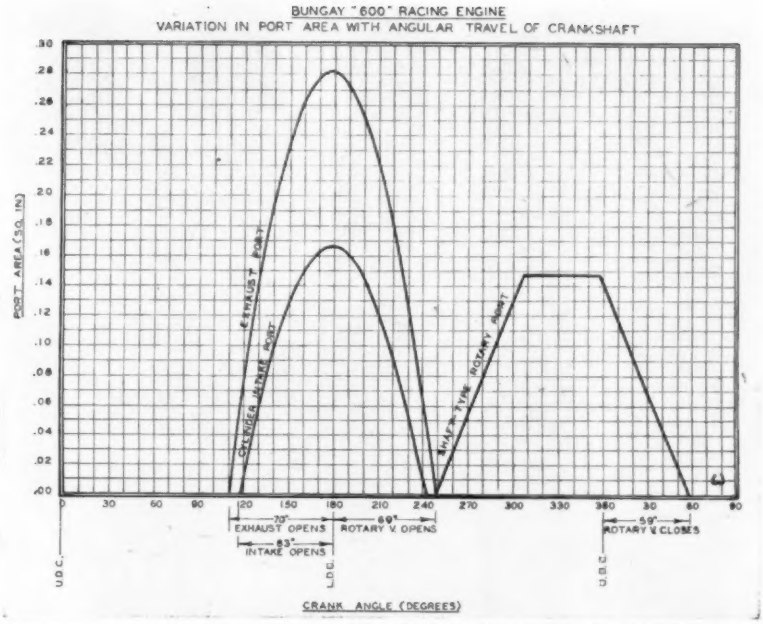
Consideration must be given to the disposition of available space between intake and exhaust ports. Usually the area of the exhaust port is made greater than that of the intake port. Intake port area should be large, however. Manufacturers of racing engines have not always taken full advantage of the available space for porting. Even in the *Hornet*, which has an outstanding performance record, it is only in the converted model that maximum intake port area is provided. An increase in intake port area of approximately 75%, together with certain other changes including a lighter piston, has resulted in the brake horsepower being increased about 50%, according to figures given out by the manufacturer.

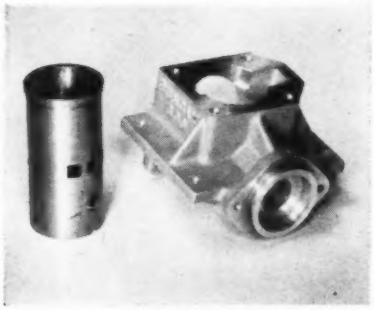
By increasing intake port area 50%, the speed of the *Bungay 600* has been increased 1,000 rpm, that is, to cover 21,000 rpm. What is probably the extreme limit of port area is found in the *Dooling*, where the five intake and six exhaust openings completely ring the cylinder with very narrow bridges between each opening.

Among the curves presented here, is one which shows not only the port timing of a typical crankshaft rotary valve racing engine—the *Bungay 600*—but also the variation in port area with angular travel of the crankshaft. It will be seen that the exhaust port opens 70° before bottom dead center. The rising curve is steep and convex, which shows that the port opens rapidly, but the area becomes greater at a decreasing rate because the piston is decelerating. The intake port opens 63° before bottom dead center, that is, 7° after the exhaust port opens. When the piston reaches the bottom of its stroke and the ports are wide open (peaks of the curves), it will be seen that the intake port area is .166 sq. in. and the exhaust port area .281 sq. in. As the piston moves up, the ports close slowly at first and then more rapidly as the speed of the piston increases. Both ports close at the same number of degrees after bottom dead center that they opened before bottom dead center.

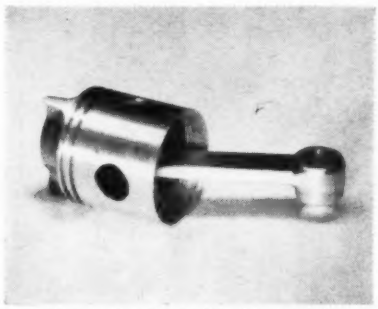
The graph shows that the shaft type rotary valve starts to open at 69° after bottom dead center or just about as the exhaust port closes. It opens at a uniform velocity for 60° when it is fully open. It remains open for 50° and then starts to close at uniform velocity. It is fully closed at 59° after top dead center, the total period of opening being 170°.

While it is comparatively easy to plot the rotary valve graph, in order to plot the cylinder intake and exhaust port curves it is necessary to calculate or determine graphically the distances the piston moves for each 10° of crank rotation and then calculate the partial port areas corresponding to each of these distances. The length of the connecting rod must be known since this affects the piston motion. Because of the angularity of the connecting rod—which increases as the length of the rod is decreased—on the down stroke the piston accelerates to maximum speed in less than 90° of crankshaft rotation, and therefore has correspondingly





Bungay case and unfinished cylinder sleeve



Piston and rod assembly of same engine

more than 90° of shaft rotation to decelerate to zero speed, reached at end of the stroke (180° of shaft rotation). Since at any given engine speed degrees of crankshaft rotation correspond to units of time, this shows that the piston has less time to accelerate to maximum speed than it has to decelerate to zero speed. Going up, the piston has more time to accelerate than to decelerate. These irregularities would be eliminatel if the rod could be made infinitely long.

The inertia forces due to the varying speed of the reciprocating parts are the chief cause of engine vibration and high bearing loads. While the energy stored in the reciprocating parts during acceleration is returned to the crankshaft during deceleration, if the parts are heavy, the inertia forces and therefore the bearing loads will be higher, and engine power will be reduced because of frictional losses. Since the inertia forces increase as the square of the engine speed, the importance of keeping the reciprocating weight of high-speed engines low is obvious. Because the extreme upper end of the connecting rod is entirely reciprocating weight and the extreme lower end entirely rotating weight, it is usual to assume that one-half of the weight of the rod is reciprocating weight.

The primary unbalanced inertia forces are those due to variation in piston speed (neglecting the irregularity caused by rod angularity) while the secondary unbalanced inertia forces are those due to rod angularity alone. In a single-cylinder engine both cause vibration, although the former can be reduced by a crankshaft counterbalance weight.

Increasing the length of the connecting rod, decreases rod angularity but increases reciprocating weight, so a com-

by EDWARD G. INGRAM

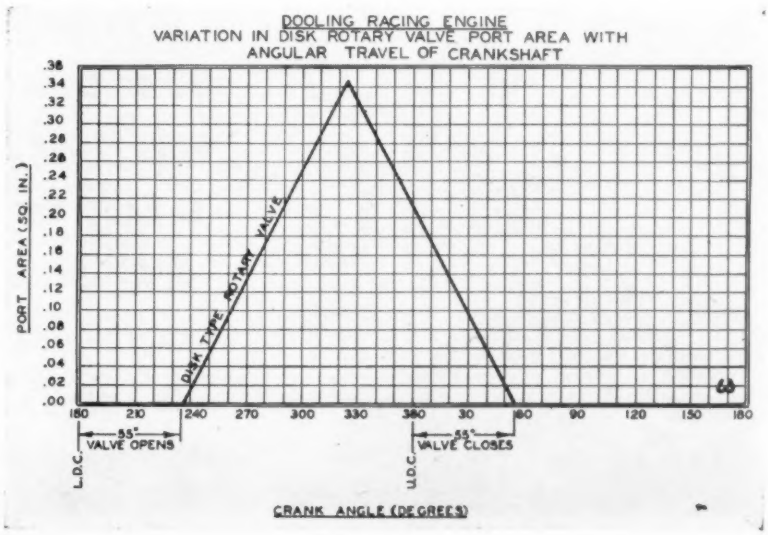
promise must be made. In model racing engines the ratio of connecting rod length to stroke usually is around 1.66 to 1. In the *Bungay* the ratio is 1.68 to 1. The *Hornet* has about the same ratio. The *McCoy 60* has a somewhat longer rod, the ratio of rod-length to stroke being 1.84 to 1.

Most manufacturers of racing engines, including *McCoy, Hornet, Dooling* and *Orr,* prefer the backplate or disk rotary valve to the hollow crankshaft type. With this design the end of the crankpin projects into a hole in the disk so the disk revolves with the crankshaft. The rear of the crankcase forms the seat of the valve. A long slot in the disk registers for the proper interval with the port in the backplate to which the carbureter is connected. Gas pressure combined with the capillary attraction of the oil film hold the disk to its seat. The rotary disk design permits a larger port area to be used because the port is not limited by the diameter of the crankshaft. The path from carbureter to crankcase is direct, so the gas mixture is not required to turn any sharp bends.

Also presented is a graph showing the variation in port area with shaft rotation in the disk rotary valve used on the *Dooling.* The figures are based on measurements rather than on data supplied by the manufacturer and therefore are approximate. It will be seen that the disk valve opens faster than the shaft type valve. The maximum opening is more than twice as great, although this may not mean too much because the passage to the carbureter has a cross-sectional area of less than one-half the area of the disk valve opening. Curves showing the variation in rotary valve and cylinder port area with shaft rotation in the case of the *McCoy 60* are shown at the start of this article.

An objection to the disk rotary valve is that it is difficult to supply the bearing supporting the disk with adequate lubrication and sometimes this bearing overheats and fails. Some experienced modelers install a special ballbearing at this point. A ballbearing is standard equipment on the *Orr 65* engine. It would seem that the use of an *Oilite* bearing at this point would provide a simple solution to

(*Turn to page* 48)



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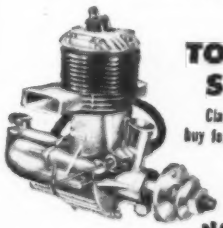
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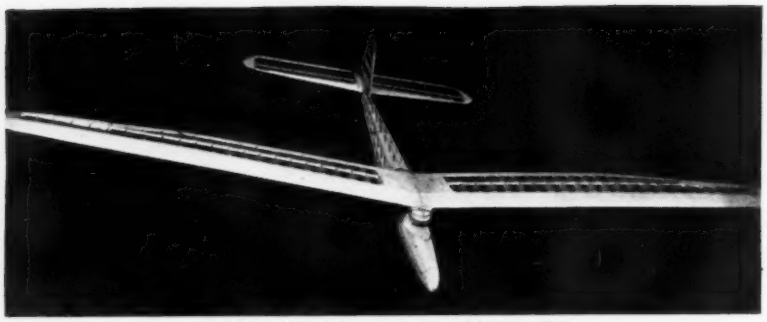
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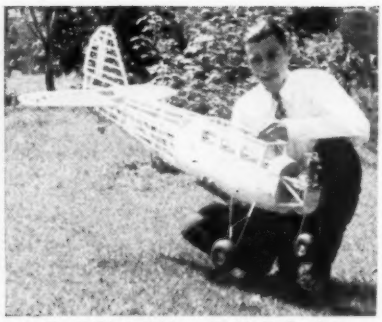


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No. 1 Builder R. J. P. Thomas calls this glider the *Albatross*



No. 2 Edwin Bridge with his R. C. plane



No. 3 Charles Wood sent this pic of Jim Amis and model



No. 4 M. Alexander and G. A. Stephens with two Orwick powered original designs

Air Ways

News of Model Airplane Experimenters From All Over the World

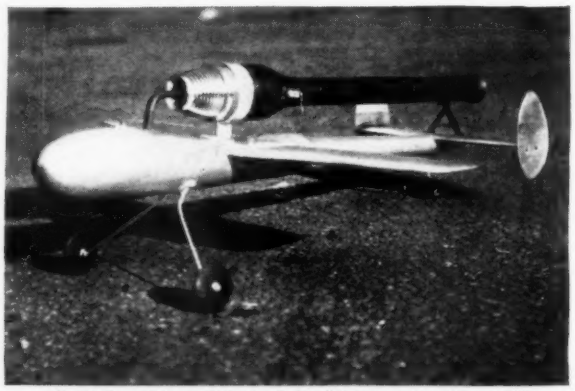
THE BRITISH NATIONALS held this past summer for the third time offers some interesting parallels and contrasts to our own Nats, and to contest flying here in general. A very interesting summary on the British event appeared in a recent issue of their trade magazine, THE TOY TRADER & EXPORTER. The writer apparently found the big meet disappointing in many ways, for he writes, "The keen 'competition feeling' which should be present at such an occasion appeared sadly lacking. Few of our leading competition fliers seem to have made a very serious effort to compete in the free flight classes; the standard of flying was, on the whole, poor . . . " He notes, however, that the modelers were well handled, the recovery service excellent and the officials worked hard and did a good job.

What upset our observer most was the large number of crackups, which were doubtless due in some part to the high winds. It should be pointed out here that all British free flight events are R.O.G.—no hand launching of powered models is allowed under contest rules. Since the author feels that a high mortality rate is undesirable from the standpoint of both the model builder and the spectator, he suggests that hand launching be permitted at the discretion of the contest director, or that the contestant be given his option of hand launch or R.O.G., with a bonus of 5 or 10% of his flight duration if he chooses the hard way. This bonus suggestion is an interesting variation on the idea being advocated over here whereby the modeller can choose a 15 sec. motor run and hand launch, or 20 sec. with R.O.G.

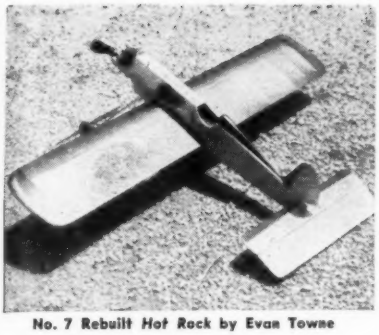
The English commentator feels that rubber flying in that country is on the way out, judging from entries at their Nationals, and also as a matter of fact, from the number of entries in the Wakefield



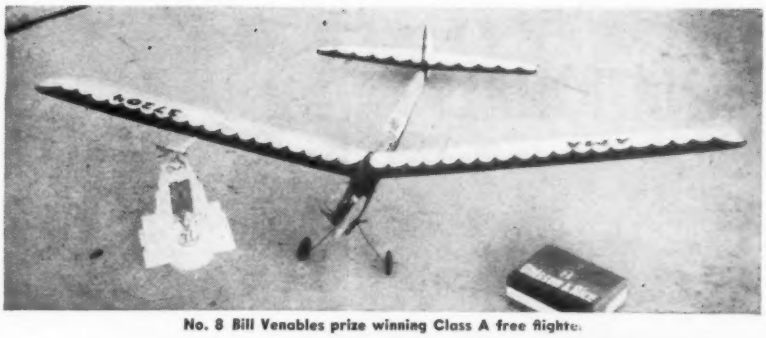
No. 5 Sidewinder built by Jack Kehoe has total weight of 7 oz.



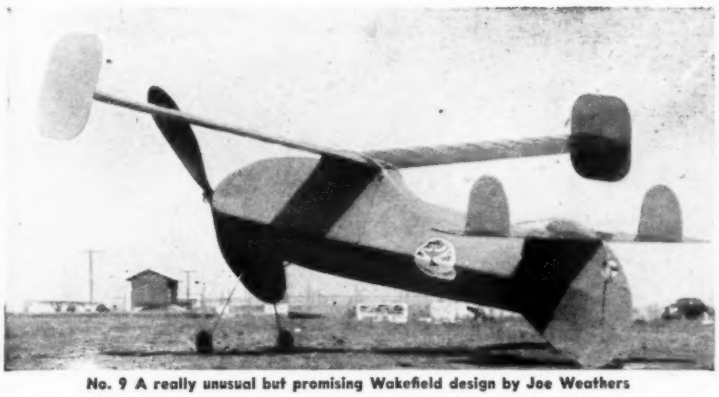
No. 6 *Dyna-jet* speedster by S. W. Baker has given fine results



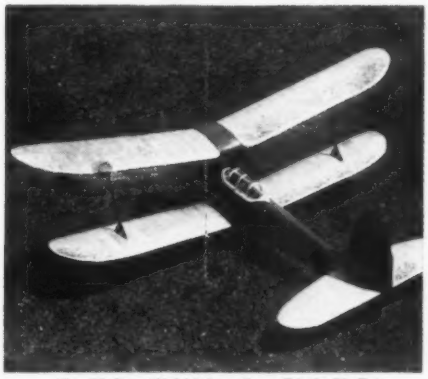
No. 7 Rebuilt *Hot Rock* by Evan Towne



No. 8 Bill Venables prize winning Class A free flight.



No. 9 A really unusual but promising Wakefield design by Joe Weathers



No. 10 Beautiful biplane from Edwin Stoffel

Eliminations. Yet he notes that the keenest competition is always found among the rubber model fliers.

Controline flying is, of course, rather new in England, and oddly enough, it is developing just oppositely to the way it has in America. The English modelers are now going all out for stunt flying; controline speed work is very rare and there are no contest events for it. The writer feels, as do other British modelers, that a full line of speed events are a must for future Nationals.

The English contest rules have been worked out so that the number of different events and sub-events can be kept to a minimum. Thus free flight gas models of all sizes compete together; in many events there is no breakdown into age groups, Juniors, Seniors, and Open contestants flying together. The English writer, therefore, advocates splitting gas model events up according to engine size, and further, splitting these engine size groups up into Junior, Senior, and Open classes. He advocates this same breakdown for controline stunt. Thus we note that while the rules making authorities in the U. S. are trying their best to halt the ever-growing numbers of classes, age groups and events, their English counterparts are being urged in just the opposite direction. Maybe both groups could benefit from a study of the problems of each other, so that a desirable middle ground might be reached in both countries.

DO YOU KNOW this man? From Richard Gooding, of Hobbycraft (111 Clinton St., Wausau, Wis.) comes a letter from which we quote herewith: "A Mr. Carl B. Bernhard, short, weight about 190 pounds, about forty or forty-five years old, scant grey hair, short pointed nose, is wanted for disappearing with about $200.00 in model contest trophy and prize money.

"It is thought he will try to secure community confidence thru hobby shops and club activities, as he did here.

"He was last known to have a McCoy 49 #7662, and Super-Cyc. '60,' and a Madewell '49,' it is possible he will try to sell these engines. He is interested chiefly in speed flying.

"He seldom wears a suit coat, and usually wears sport shirts or a T-shirt; he is clean and neat appearing.

"His usual occupation is floor planner in store layout work, and window trimmer; he is seeking employment in this field.

"Anyone recognizing this man should call his local police department, and have him held for the Sheriff's Department, Marathon County, Wausau, Wisconsin."

No further comment needed!

* *

A beautiful towline glider framework is our first picture this month. This glider was built in 1947 by R. J. P. Thomas (75 Ward Street, Oldham, Lancs, England). He has named it the *Albatross*. The finished model turned out so well that it has been used as a display piece in several model shops. The wingspan is 66" and balsa construction is used throughout. Also, Mr. Thomas is a little doubtful of the ailerons which were fitted on the wing tips for adjustment purposes. He feels that they upset the trim of the model too easily.

Picture 2 shows Edwin Bridge (Apartado 49, Medellin, Colombia, South America) with a practically completed *Super Buccaneer* radio control job. This is his second attempt at R. C. work. The first was a very successful ship designed and built by Nel Rodriguez. Mr. Bridge was the radio control expert on the job and a helping hand was also given by F. Uribe. A Rudevator, as shown in a past M. A. N. issue, was employed on the first ship; the new job will use conventional escapement on the rudder as the builders want to try out the various types of R. C. equipment. Incidentally, these are the first two radio control ships to be built in Colombia.

Although picture No. 3 was taken and submitted by Charles Wood (3002 Forty-sixth Avenue, S. W., Seattle 6, Washington), the airplane and its proud builder, Jim Amis, are depicted. The little rubber job has about 100 sq. in. of area and was originally intended as a miniature Wakefield design. However, it turned out to be rather heavy and is just a good sport flier with a fast climb and a flat high-speed glide. Mr. Wood is a model builder with 16 years' experience and has really become very interested in Wakefield competition. We hope he can make the meet in 1950.

In our fourth photograph, the two big ships being held by S. M. Alexander and G. A. Stephens are both original designs, powered by *Orwick* engines, and have a 8' span. The ship on the left, called *King Size*, has a wing area of 1045 sq. in. and weighs 65 oz. *Harpoon*, the ship on the right, has an area of 1072 sq. in. and a total area of 402 sq. in. It has made a flight of 32 minutes when the dethermalizer failed to work. Both ships, however, have turned in consistent flights of three to four minutes.

The sleek sidewinder shown in No. 5 belongs to Jack Kehoe (230 Conkey Avenue, Rochester 5, New York). When the picture was taken, the ship had been flying nine months. It is powered by a reworked *Arden .199* and weighs, with a full fuel tank, 7 oz. The fuselage is only 1" thick at the deepest point. The model was given four coats of red auto lacquer. No hot proofer was used because of the weight involved. Mr. Kehoe finds that the fuel and the exhaust do not bother the finish since if the ship is wiped off after every flight and reasonable care is exercised in filling the tank. The model was built in solid form and it was even necessary to cut off the cowl to replace fuel line. Such a job has been required

(*Turn to page 52*)

NATIONALS

More views taken at the 18th Nats. . . . see if you can pick out your friends in these pix from Olathe



R. C. winner Walt Good and M.A.N. Editor McEntee "check over" the Roberts Perpetual Award



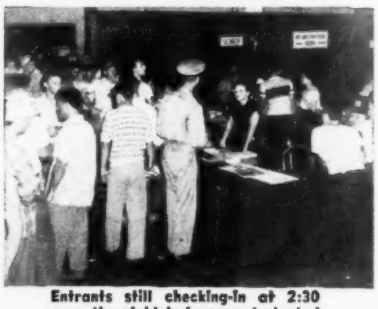
A *Minnow* controline scale model being touched up for the next day's event



Class A & B Free Flight Gas entrants, processing here, were twice as numerous as those in C-D



Jim Walker takes an official flight in Radio Control, with hand launch start



Entrants still checking-in at 2:30 a.m. the night before meet started



Bill Tharp with his 2nd place winning *Rearwin* rubber scale job



Merrill Hamburgs' Detroit group with a portion of the hardware they won



B-29 from Atlanta, Ga., had *Forster* 29's and a flying weight of 14 lbs.!



Frank Greene with his special PAA-Load plane, powered by *Arden* .199 engine



Dunked again! After another tip-over like this, the ship roared off for close to 10-min. flight



Timers are all set as this contestant gets his ship away



2nd Ass't Postmaster General Paul Aiken helps Denny Davis put mail in PAA-Load Ship



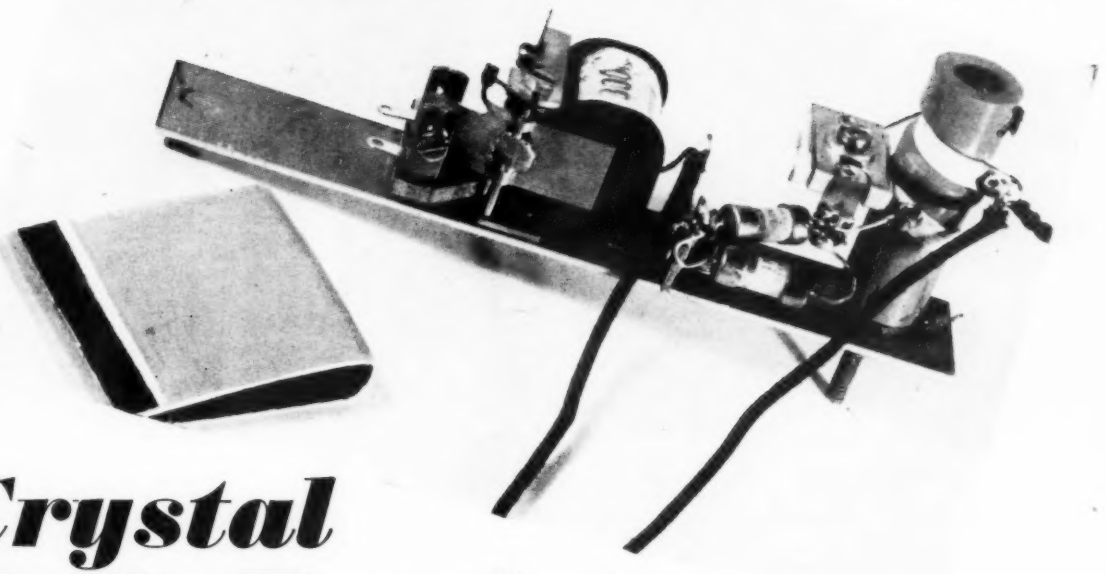
Commander Russ Jones discusses engines with a scale event entrant



Jesters, Jiggers, Jeepers, etc. "Pop" Forster holds twin *Fox* .29 powered stunt plane

by RUFUS P. TURNER

The 144 mc. crystal receiver compared for size with a match book



Crystal R. C. Receiver

CRYSTAL diodes previously have not been employed to any great extent in radio controlled models. This has been due to the inherent low sensitivity of the crystal detector, a fact which has been regretted by many experimenters because an ultra-high-frequency crystal receiver can be made extremely small, light in weight, and simple.

Recently, Sylvania Electric Products, Inc., introduced a new high-conduction germanium crystal diode, the Type 1N56, which is much more suitable for radio control work than previous types. For a given applied signal voltage, the D.C. current output of the 1N56 is approximately twice that afforded by the more familiar Type 1N34. The new 1N56 has the same physical size as the 1N34.

Still greater output may be obtained by employing two 1N56's in a full-wave detector circuit. And this advantage may be enhanced further by applying to the two diodes a D.C. voltage from a small local battery. The circuit for a radio controlled receiver of this type is described in this article. The accompanying photograph shows the small receiver unit complete with relay, and ready for such control operations as ordinarily are performed in model aircraft.

It is believed that R.C. receivers of this type will meet with favor among model airplane experimenters, since crystal sets require no tubes and are sufficiently compact and lightweight to be installed easily in very small model aircraft. Although the special circuit described in this article requires a small battery, the battery drain is but a tiny fraction of the filament current drawn by one tube; and the same battery may also be used, in a number of cases, for the controlled device in the plane.

PRINCIPLE OF OPERATION. In order best to understand how the author's new circuit operates, it is necessary to review briefly the operation of the older, conventional crystal R.C. circuit shown in Fig. 1. Here, a simple antenna and tuned circuit pick up the radio-frequency control signal and apply this signal voltage to the crystal diode. In turn, the diode rectifies the radio-frequency voltage and delivers a D.C. current to the coil of the sensitive relay. If the control signal voltage is strong enough, a good amount of current will be delivered by the diode and this current will actuate the relay. But a rather large signal must be used (that is, the control transmitter must be relatively high-powered) in order to accomplish this action. This is because the crystal is not so sensitive a radio detector as a tube would be and does not supply amplification as does the tube. Furthermore, the model in which the pickup circuit is installed cannot be flown far from the controlling transmitter without losing radio control, because the strength of the signal decreases rapidly as the gap widens between transmitter and receiver.

Now, suppose we insert a battery and rheostat at the point marked "X" in Fig. 1. The rheostat may be adjusted (in the absence of a received radio signal) to the point where current flowing from the battery, and through the diode and relay coil, is just slightly less than the amount required to actuate the relay. The radio signal then will be called upon to furnish only the small *additional* current necessary to pull-in the relay. In this way, the radio signal is not required to do the

(*Turn to page* 40)

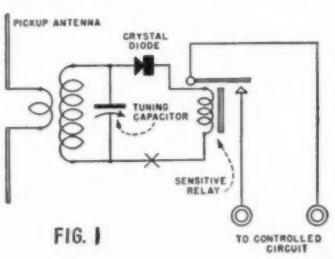


FIG. 1

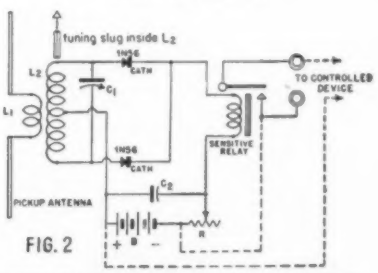


FIG. 2

BE CAREFUL TO OBSERVE PROPER CRYSTAL AND BATTERY POLARITIES.

New JETEX 50

ONLY $1.95



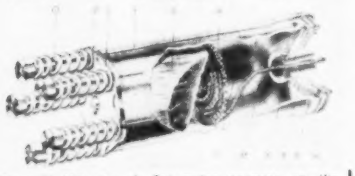
JETEX 50 outfit includes Fuel, Wicks, mounting clip, - accessories and full instructions.

The smallest of the JETEX motors, this is the ideal unit to start in power modelling. It is simple to operate, safe and cheap to run and very inexpensive to buy! It is easily fitted to models of all kinds, and will fly a model airplane of 12" to 20" wing span.

SPECIFICATIONS

Thrust—1/2 oz. Overall Length—1 5/8"
Duration—approx. 15 secs. Diameter—11/16"
Weight—.2 oz. Weight of Pellet—.2 oz.

THE INSIDE STORY



How It Works A Jet motor operates on the principle that to every force there is an equal and opposite force.

A flow of gas through a nozzle, or jet, requires a force to give it high velocity, and there is thus an equal force on the container, driving it forward.

In JETEX motors the gas is generated at a constant rate by a slow-burning gas producing charge, and is projected through a small nozzle at supersonic speed. The efficiency of JETEX motors depends to a very large extent on careful design and extreme accuracy of workmanship.

What It Does! JETEX POWER UNIT—provides the very latest form of power-jet propulsion—for all types and sizes of model aircraft, speedboats and racing cars. Its high performance and efficiency are illustrated in the smallest motor in the range, which, although only 11/16" in diameter and 1 5/8" in length can fly a model plane with 12"-20" wing-span.

Scale models of jet fighters, multi-engined machines, racing boats and cars, can all now be fitted with this modern revolutionary form of power.

JETEX Units are easy to fit to any model, very simple and quick to start; no moving parts to wear out or break; no complicated adjustments to be made—in fact practically nothing to go wrong.

Jetex Solid Fuel has been produced after many years intensive research by the world's leading scientists. It is NOT an explosive or a "firework" but is a slow-burning gas producing composition giving a controlled output of power, with perfect safety both in handling and in operation.

JETEX OUTFITS

ADVANTAGES

Nothing to Wear
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Easy to Install
Nothing to Break
Instant Starting
Clean in Use
Nothing to Operate
Constant Thrust

All outfits complete, ready-for-use. Include Fuel, Starters, Mtg. screws, spare washers, loading tool, dihs., instruction booklet.



100

Ideal "all-purpose" unit: Easily fitted to all type small models. Will fly 18" to 30" model plane. SPECIFICATIONS: Thrust—1 oz. Duration—20 secs. Wgt.—.6 oz. Length—2 1/4". O.D.—1". Fuel Wgt.—.3 oz. COMPLETE OUTFIT $1.95.

200

Similar to above, but larger and twice as powerful, for advanced modellers. 1 or 2 fuel charges may be used at one time giving constant power for over 1/2 min., to fly a model "out-of-sight" or power boat 1/4 mile at high speed. SPEC.: Thrust—2 oz. Duration—20 to 30 secs. Wt.—1.1 oz. Length—2 7/8". O.D.—1 7/32". Fuel Wt.—.35 oz. COMPLETE OUTFIT—$6.50.

350

Super-Jet for serious modellers, for competition. Takes 1st place in mechanization of modern models. Takes 1, 2 or 3 charges giving 12 to 36 sec. duration with 3½ to 4 oz. thrust. Wt. 2½ oz. Length—3 3/4". O.D.—1 3/8". Fuel Wt.—.4 oz. COMPLETE OUTFIT $10.

Fuel-Refills Supplied in cartons of 10 charges for all size JETEX with spare plastic ignitor wicks. For 2 50—65c; 2 100—75c; 2 200—95c; 2 350—$1.00.

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At 32nd St. Open daily 'til 6:30; Thurs. 'til 9 P. M.

DEALER INQUIRIES INVITED!

Plymouth Third International

(*Continued from page* 11)

D'Alessandro, of Philadelphia, making a smooth 1413.4 secs., and Ken Tempelmeter, of St. Louis, right on his stabilizer with 1388.0.

Since the age breakdown of the various groups differs with the Plymouth Meet from the AMA set-up, perhaps it would be best to remove the quizzical wrinkles from the faces of the readers. Novice is under 14, Junior is 14-16, Senior is 16-21, and Open is 21-26.

The Coliseum was the first scene of startling developments. Most fellows look upon girls as something to be tolerated in modeling but not to be taken too seriously. They are helpful for holding gas cans, chasing free flight jobs or, if properly trained, they might even be entrusted to release a controline job upon a given signal. But as for flying models, that's a different story. As one fellow expressed it when he saw Sylvia Lanzo do 227.2 secs. in Indoor Stick to take the Novice Event, "I thought all they was good for was Club Secretaries." A slightly dazed Bill Ward realized his 222.0 secs. was 2nd to Chester Lanzo's daughter, but we think this incident and one other we will relate later has given the girls a new lease on life in the model hobby sport.

Before we get into the realm of the whirling dervish boys too deeply, one outstanding fact was revealed as closing time of the last day rolled around. There was not one case of line breakage in the U-Control events! Two ships got away from modelers, lines, handles and all and did their best to emulate the free flight ships, but every other ship was truly "under control." This was partly to the credit of the Plymouth organization who insisted on lines a bit heavier than usual but part of the credit must also go to Matt Sullivan who was invited to supply the lines for the Plymouth Meet. Matt not only supplied the lines, he came out to Detroit, sat on the field with a special rig and made up the lines! No set of lines that had been mistreated in the slightest way was used again, in fact, the wire trash basket behind Matt looked like a stock pile of control wire!

Incidentally, you'll probably be reading more of this in Bill Winter's *Scrap Box* column as time goes on, but Matt Sullivan made the suggestion and the boys rather liked the idea of a single diameter line for each of the four speed classes, heavy enough to withstand the pull test of the heaviest plane for that class. It will take a bit of working out, but present suggestions range about .008 for Class A, .010 for B, .012 for C, and .014 for D. Plymouth, at Detroit, supplied .010 to .016 for additional safety this year; but in view of the record of no breakage, it is felt that the one-step lower arrangement will be safe.

The other "female upset" (some were calling her an *upstart* but changed their minds when she flew) was Sara Mitchener of Peoria, Ill., who flew to 1st in Class B Novice with 99.52 mph to beat Dick Modler's 99.46 and Henry LeVon's 90.05. "Mitch" is a cute slip of a gal with a feminine "crew cut" (feather cut) who looks like a 100 mph Class B job might fly *her!* Instead, she showed up on the field in modeling clothes to do a workmanlike job of taking the Novice Event.

One of the smoothest-working speed teams seen on the field was that of Stan Grish, 3rd place winner in Class B Senior Speed, and a few others (see tabulated list). Stan, with his brother and his sister, clocked off the starting, adjusting, and launching of the ship with such smoothness that everybody stood around and watched with open mouths. Several photographers, intrigued with Sis Theresa's long blond locks tumbling from under a Plymouth helmet, tried to take pix but the ship was in the air before they could fire a flash-gun!

On the whole, ships used for all events were fairly conventional. The most interesting part of the Plymouth Meet was the contestants, which is as it should be. Models are built by the modelers and should be an expression of the fellows themselves, but lately too much stress has been placed on what sort of cockeyed configurations fellows could dream up to make their ships look different than the others. Here at the Plymouth Meet, ships were all highly efficient but simple, straight-forward types. The skill of building and adjustment were the deciding factors this year.

For speed controline this year, the main dish served up was the setting of four new WORLD'S records . . . The Federation Aeronautique Internationale has finally recognized "circular flight" on an international basis, largely through the efforts of AMA, and Plymouth was quick to offer to set up the facilities for establishing records. It's not quite as simple to set an F.A.I. record as it is to set an AMA record—the F.A.I. requires electronic timing by one of the few machines in the world capable of doing the job, filming of the entire flight, then too, the flight regulations are more stringent. All flights must be a full kilometer in length which mean a few more laps than we have in AMA regs, the flier must designate which lap he wants timing to begin with and there are a few other items we won't go into here that make establishing a World's Record a tough job. Plymouth started out to sponsor world's Record attempts with the free flight straight line speed trials at Alemeda a few months ago. Eugene Styles of Oakland, Cal., made an official record 80.444 over the 100 meter course required, flying first in one direction, then the other between 100' wide markers. Dozens of attempts were made before one complete round-trip was recorded and we'd like to see more of the corkscrew-climb free flight boys try that straightaway deal! At Detroit, Classes A, B and C, as well as jet, were set up for F.A.I. flight attempts. The U.S.A. now holds all four of the "circular-flight" records with marks that will make it tough for other nations to take them away from us! Tom Baker, of Kings Mountain, N.C., sizzled a jet record for 144.83, with the jet running out of juice in the lap after timing stopped! Class A was tied down by Bob Rawe, of Kenmore, N.Y., who took what the F.A.I. designates as "Class I" (up to .15 displ.) with 39.30 mph, Bob Veasey, of Wilmington, Del., did 128.28 mph for the Class II record and Bob Hartlieb, of Lebanon, Pa., set the Class III mark at 142.16.

More information is now being sent out on these new records by AMA and MODEL AIRPLANE NEWS will soon present all the dope on the requirements for setting F.A.I. records in various categories. The F.A.I. records require considerably more effort and perseverance than AMA records, but that's as it should be, since World's Records are that much more of an honor to hold, with many more modelers from every country in the world competing for them.

The banquet Plymouth gave for all the

(*Turn to page* 36)

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$3.95

INCLUDING RUBBER WHEELS

ONLY SCIENTIFIC GIVES YOU ALL THIS

Completely Prefabricated



GENUINE CARVED BALSA FUSELAGE NOT BAND SAWN, MOLDED OR SHAPED

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LANDING GEAR, READY FORMED SPRING STEEL

RIBS ACCURATELY DIE-CUT READY TO USE

WOOD PARTS CUT AND DRILLED READY FOR FINISH SANDING



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DIE-CUT BULKHEAD

DECALS, FORMED WIRE PUSH RODS

PLASTIC PILOT'S HEAD JUST PLACE IN COCKPIT

Only Scientific's modern up to date automatic machinery makes it possible to offer a sensational kit like the "KINGPIN" at the amazingly low price of $3.95.

Compare the "KINGPIN" with others selling at $4.95, $5.95 and even $7.50 and we dare say you'll find the "KINGPIN" the biggest bargain of all!

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Purchase the "KINGPIN"—Build it, Fly it, Stunt it,—put it through every possible test and if it doesn't Out Fly—Out Stunt—Out Perform every known model on the market we'll refund every cent you paid for it. The "KINGPIN" is fully guaranteed to give complete satisfaction.

SPECIFICATIONS

Large wing area containing over 200 square inches with 8" chord and length of 28".

For all "A & B" engines of .099 to .29 displacement and some small class C engines. The "KINGPIN" may be flown Glo-Plug, Diesel or Ignition.

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NO HARDWOOD PARTS
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NO EXCESS WEIGHT
GUARANTEED TO FLY

THESE SCIENTIFIC SUPER - FLYERS ARE HONEST TO GOODNESS MODEL AIRPLANES, DESIGNED BY EXPERT FLYERS FOR LONG ENDURANCE FLIGHTS.



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"MAJOR" 35c
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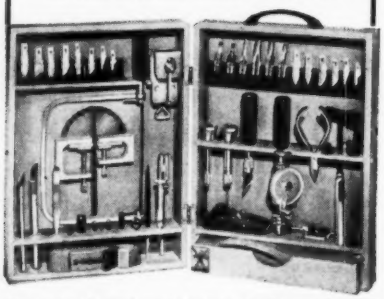
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contestants should have more than mere words to describe it—the steak, ice-cream cake, the magician who wasn't a magician but had the crowd in stitches, the display of hardware and manner in which every winner was honored with the presentation of his award, all made for an occasion that will long be remembered in model aviation annals. Many fellows felt that it was worth trying to fly models in the Plymouth Events just to attend the banquet.

The part of the Plymouth Internationals that will have everybody chuckling till the next one was the announcing of Don Stremmel ("Flannelmouth Don" of the *Smiling Jack* comic strip) and our own Johnny Clemens, of Texas, during the flying. We didn't see it, but we understand Don's face turned a bit pink when he discovered a boat he was hailing on the river via the public address system turned out to have General Motors cars on it . . . and Johnny's highlight was an attempt at an F.A.I. record with a pair of stunt model wings strapped on as he tore (?) around a controline circle with a Plymouth shirt on topside and one on the bottom side, too! He deserves some sort of recognition even if people had to stand on their heads to read the shirt that was on his backside.

Plymouth Third International Winners

NOVICE HIGH POINT TROPHY—Henry D. LaVon; PLYMOUTH CONTROL LINE JET TROPHY—James W. Richmond 139.16 mph; WORLD'S RECORD CONTROL LINE JET SPEED PLAQUE—Thomas P. Baker 144.83 mph; WORLD'S RECORD STRAIGHTAWAY SPEED PLAQUE—Eugene Styles 80.444 mph; JUNIOR HIGH POINT TROPHY—Herbert L. Davis 39 pts.; OPEN HIGH POINT TROPHY—Charles Schuette 34 pts.; STINSON SCALE MODEL TROPHY—Robert O. Rada 213.3 pts.; AIR TRAILS STUNT TROPHY—James E. Snyder; SENIOR HIGH POINT TROPHY—Anthony D'Alessandro 29 pts.; GIRLS HIGH POINT TROPHY—Sylvia J. Lanzo; INTERNATIONAL CONTROL LINE SPEED RECORD PLAQUES—*Class I*—Robert Rawe 99.30 mph; *Class II*—Robert Veasey 128.28 mph; *Class III*—Robert J. Hartlieb 142.16 mph.

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INDOOR CABIN *Open—1.* Anthony J. Becker, Jr.; 2. Robert Bienenstein; 3. Don Kennedy; *Senior—1.* Erwin E. Rodemsky; 2. Anthony D'Alessandro; 3. George Xenakis; *Junior—1.* Otto Heithecker; 2. Martin Bainbridge; 3. Richard C. Kowalski.

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CLASS B *Open—1.* Charles Schuette; 2. Jim W. Clem; 3. Joe Roland Williams; *Senior—1.* Raymond L. Shearer; 2. Eddie J. Schwarz; 3. Stanley J. Grish; *Junior—1.* Kenneth R. Kimmel; 2. Herbert Davis; 3. Warren James Tomme; *Novice—1.* Sara H. Mitchener; 2. Richard A. Modler; 3. Henry D. LaVon.

CLASS C *Open—1.* F. V. Claire; 2. Jim W. Clem; 3. Richard F. Swenson; *Senior—1.* Stuart Hollander; 2. Raymond L. Shearer; *Junior—1.* Warren James Tomme; 2. Kenneth R. Kimmel; 3. John F. Hice.

CLASS D *Open—1.* Sid Tanabe; 2. Whitley Marlin Roberts, Jr.; 3. Charles Schuette; *Senior—1.* George G. Fong; 2. Stanley J. Grish; 3. Robert Veazey; *Junior—1.* Warren James Tomme; 2. Kenneth R. Kimmel; 3. Herbert Davis.

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Outdoor Rubber

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OUTDOOR STICK *Open—1.* Carl E. Lindsey; 2. David J. Rosenberg; 3. Robert Bienenstein; *Senior—1.* Anthony D'Alessandro; 2. Kenneth E. Tempelmeyer; 3. Carl M. Redlin; *Junior—1.* Edgar C. Broome; 2. Jim L. Lempke; 3. Constance E. DeMuzio.

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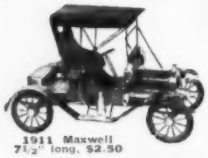
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30" ERCOUPE $1
30" AERONCA $1
Above:
32" LANCER (Top) $1
32" FLEETSTER $1.25

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Scrap Box

(*Continued from page 6*)

you don't have to touch needle valve after starting engine. A piece of triangle stock glued behind tube provides streamlining and support. Frank Ehling, now with Zaic's, had a Buck Rogerish flock of sheet balsa jobs for the new small *Jetex*. While the *Jetex* is fun, a lot of builders have been puzzled by variation in size of turn during the flight. "This," says Frank, "is due to the increasing thrust of the jet with higher flight speeds, so your adjustments (also warps!) become increasingly effective." Now, we know!

From C. F. Marincowitz, the secretary of the *Germiston Skyraiders*, South Africa, comes a pungent protest about what has been termed the "feud" between Pretoria and Germiston. "Feud," in our modeling lingo, C.F., means "keen competition." A hot contest is sometimes called a "brawl." So we mean the same thing, even if the "terms" are different!

"The so-called feud in the Transvaal between Germiston and Pretonia is conducted in a manner which reflects true sportsmanship," says Marincowitz. "We attend every meet of theirs, as they do ours, and our comradeship runs pretty high. I admit that Pretoria is leading the field over here as the West Coast boys seem to do in the States.

"I can also say that our boys fly stunt, starting the hard way (one loop, one model) and that they do not use mine dumps to fly on, as the fine dust serves as a good grinding paste. Engines are sold at a competitive price, like all other supplies. I know that the latest engines are difficult to get, owing to the import control. I also trust that our government will be broadminded enough to consider our hobby as an educational sport and relax the control hampering us. So Mr. Martin (the previous correspondent who forwarded a plea to swap anything but lion skins for American engines) may be assured that by being a bit patient he will not have to 'swop' his assagai for an *Ohlsson 29*."

J. M. Malherbe, Secretary of *Pretoria Aeromodellers Club*, and Mr. L. Symons, Press Secretary of *South African Model Aeronautic Association*, thoroughly cover the model situation there. Since both gentlemen contribute what amounts to full length articles we can skim but the more interesting highlights. Like the English, South African leaders are touchy about "begging" for American engines, claiming there is no need for it. Melherbe says he was able to purchase in one month, one *"23,"* a *McCoy "19,"* a dozen *O & R* glow plugs and miscellaneous *O & R* and *Flo-Torque* props. His list of engines and models, 90% of which was purchased locally at reasonable prices from model dealers, would do credit to the most active American builder. As to the *Pretoria Club:* "Two of our modelers, C. von Ahlefeldt, and B. Liebenberg, were on the Wakefield team. Our stunt flying, consisting of loops, inverted flight, and very little else, came in for drastic change when I wrote Burbank Manufacturing Company, and Bob Palmer answered. He put me onto the *Go-Devil* and now six of us are using this large Class C ship with Class B motors with outstanding success. We do the complete flight pattern, including up to six consecutive vertical eights. We all do 1-112 vertical eights with ease and won eleven firsts, eight seconds, and nine thirds at the 1949 Nationals in Cape Town. We have 83 active members, Juniors and Seniors, and hold bi-annual club championships for the 16 floating trophies the club possesses, as well as meets every two months. Only in speed have we failed to come close to the boys in the United States. Class D stands at 115, jet at 120. But it won't be long now! Fuel is the snag. Busy wrangling a few dollars to get some *O & R 30* to mix with our Castrol-Methanol fuel mixture we all use, since there is no nitro-methane available. All the boys are building team racers."

South Africa always has been an active model center and it is time we knew more

about it, so we'll let friend Symons fill in the background. Says he, "I work as a reporter for the *Rand Daily Mail*, to earn the dough to build models. Being a reporter, copped the job of editing a monthly magazine for the local club, and was given job of Press Secretary to the S.A. M.A.A., governing body of modeling in this country.

"With an area of 500,000 square miles, we have a white population of 2,500,000, with between 800 and 900 builders affiliated with the Association. Main centers of activity are Cape Town, Port Elizabeth, and East London, seaports on the South and Southeast coast of the Cape Province; in Natal Province, East Coast, main centers are Durban, our fourth big port, and Pietermaritzburg, provincial capital 50 miles inland. Inland, the centers are Pretoria, administrative capital of the Union of South Africa, and capital of Transvaal Province; Johannesburg, our biggest city, and other towns of the Witwatersrand (Ridge of the White Waters, in English, and where all the gold comes from) and Vereeniging. We have a lot of things here: two capitals, two languages, two flags, and the usual two types of modeler, free-flight and yo-yo.

"The coastal towns," continues Symons, "have coastal weather; Port Elizabeth is the second windiest town in the world; Cape Town and the surrounding area, known as the Western Province, has winter rains—and very little winter flying. Here in the Transvaal, about 5,000-6,000' up, winter is the best flying time. Beautiful clear days, little wind, and strong thermals. Weather is inclined to be windy in the summer with terrific thunderstorms in the late afternoons.

"Modeling is run by the Council of the S.A.M.A.A. Executive Officers elected each year at a General Meeting at the time of our Nationals. Each club is represented by a delegate with voting powers equal to the number of affiliated members in the club. This council, after consulting clubs, draws up rules, grants sanctions, recognizes records, etc. Rules are based on A.M.A. rules with a certain amount of F.A.I. and English influence, all adapted to local conditions. Junior events are for under seventeen. Senior above that, and Open for all. We have three classes, with 100-oz. power loading in free flight, and four classes in speed.

"Our Nationals are held in a different center each year."

And now for the lighter side. Asks D. M. Springstead, *Schenectady Aeroneers*, "Have any of the other tall stories been verified as at least partly true?" Tut, tut, D. M., you don't think a model builder would exaggerate? Reason for Springstead's comment is Fred Otten's story in a recent issue. "I don't know about the first five flights," said Springstead, "but the sixth one is fact since the model was found by hunters near the Schenectady Airport, from which site it was lost in the month of June, 1948." Tell you what, D. M., we'll turn loose the following medium-sized whopper, just to show how tall a true story can get. (You should see the ones that we fear to print!!!)

"As I am the only model dealer in town," tees off C. I. Mitchell, Jr., Temple, Texas, "all the boys bring their problems to me. A short time ago a lad of about 14 bought a secondhand engine from one of his 'ex-friends' for a buck and couldn't make it run. Since the timing apparatus was shot, I prescribed a glow plug. Very thoroughly, explained that he was to connect one lead to the plug and ground the other to the motor and, as soon as the motor started, to disconnect the leads.

"The next day he was back to inform me that my old glow plug was no good. After questioning him about his cranking procedure, I learned that he had not cranked at all but had simply connected his leads and stood back—waiting for it to start so he could disconnect them!"

And for that, C. I. Mitchell, you can take away that free subscription to MODEL AIRPLANE NEWS for the best tall but true story of the month.

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Crystal R.C. Receiver

(*Continued from page* 33)

whole job, but only a small part of the task of operating the relay—the battery does most of the work. Thus, the receiver will exhibit better sensitivity than will a conventional crystal set. This means that the controlling transmitter need not be so large or powerful, and also that the model may be controlled at a greater distance with a given transmitter.

It is a well-known electrical fact that, for a given applied radio-frequency voltage, a full-wave rectifier (detector) circuit gives more D.C. output current than the simple half-wave (single diode) circuit shown in Fig. 1. In fact, almost twice as much current can be obtained when two diodes and a center-tapped coil are used. All of this adds up to the fact that two crystal diodes in a full-wave circuit *plus* the local bias battery will give a crystal radio control receiver of increased sensitivity, while maintaining the characteristic simplicity of the crystal set. We believe that this arrangement gives the maximum sensitivity possible with crystal reception.

It should be noted again at this point that the crystal circuit (even with the improvements suggested in this article) cannot have anything even approaching the sensitivity of the conventional vacuum tube style of receiver, though it is a great deal more efficient than the single-crystal circuits that have been used previously. To get a usable range, it is probable that a transmitter of 40-50 W input would be required. Also, use of a simple beam-type antenna at the transmitter is another line of approach. Such an antenna would naturally have to be rotated constantly so that the model could be kept in the beam.

A beam-type antenna on 50 mc. would be pretty bulky, and on operation in the 27 mc. band, would probably be out of the question. However, the crystal receiver will work well on 144 mc. and possibly even higher, and in this frequency region, beam antennas become practical.

Thus, this receiver will normally be most useful for models that fly only a few hundred feet from the transmitter; and within this range, it will give almost foolproof operation.

DOUBLE-DIODE, BATTERY-BIASED RECEIVER. Fig. 2 is the complete circuit diagram of a crystal radio control receiver applying the principles just discussed. The pickup antenna consists of two short lengths of wire or rod. Each of these should be as long as the model size and permissible air drag will allow, and preferably each 1/4 wavelength long at the operating frequency employed.

The tuning coil, L_2, is a manufactured item, National Type AR-2, which consists of several turns of silver-plated strip wound on a phenolic form. This coil is center-tapped and is made with a metallic slug which may be screwed in and out of the coil (for tuning purposes) by means of preliminary screwdriver adjustment. Coil L_1 is a primary (antenna) coil consisting of 1 turn of insulated hookup wire wound tightly around the center of L_2.

The tuning capacitor, C_1, is a small, screwdriver-adjusted leaf-type trimmer having a capacitance range of 3 to 30 micromicrofarads. Once this component is adjusted for a particular operating frequency, it ordinarily will need no resetting until the frequency subsequently

(*Turn to page* 42)

Advertisement for McCoy

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a real DURO-MATIC McCOY "9"

for small planes with New DUROGLO

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McCOY
DOES IT AGAIN!

Makers of the famous line of model engines announce a real precision-built McCoy for only $7.95.

Last October a bombshell burst upon the long established model engine business when Duro-Matic Products Company, Hollywood, announced the McCoy "19" Engine at $9.95. In a few weeks news of a real McCoy engine at such a sensationally low price swept the model business like wildfire. Although Duro-Matic had been building the McCoy engine for only three years, these engines in the hands of novices and experts alike, had already captured a major share of all Official AMA Records, and popularity of the McCoy had zoomed to No. 1 position as the leading contest winner.

But modelers felt the need for McCoy power in a small engine, and they immediately began clamoring for a midget size McCoy engine.

To McCoy engineers this presented a knotty problem. To preserve the exclusive design that had made the McCoy the undisputed leader among all model engines in such a tiny engine, presented what appeared at first to be an almost unsurmountable engineering feat. Could parts be made in such fantastic small scale, requiring piston rings that measured .500? And even if they could be manufactured, would not assembly requiring watchmaking precision make the final cost prohibitive?

After months of exhaustive engineering work and ceaseless experimentation McCoy engineers solved the most intricate problems. Working with Perfect Circle engineers, the smallest piston ring ever made was finally perfected and in collaboration with Testor chemists a one all-purpose fuel was perfected. Finally to enable any novice to easily and quickly learn to fly this small engine in U-Control and Free Flight, a perfectly matched tailor-made Testor propeller and airplane kit were perfected through the joint efforts of Testor and McCoy engineers.

Last month the new McCoy "9" passed its final flight tests in a Testor Freshmen Trainer. In the meantime McCoy engines had flown as winners to amass for their delighted owners, every single AMA Official Record. In addition McCoys took 16 "first" places at the New York Mirror meet and became the undisputed winner at the National's. With straightforward advertisements (left) the new McCoy "9" was introduced at an amazing low price of $7.95.

The manufacturers who had captured the hobby field with a McCoy engine in every contest class, now had a real McCoy engine for the general public, the greater portion of whom had never tried building or flying model airplanes, that would undoubtedly influence many of them to learn the thrill of flying their own plane. With this new combination of perfectly matched engine, airplane kit, propeller and even fuel, the novice for the first time had everything he needed to get started, with every assurance of success without previous experience.

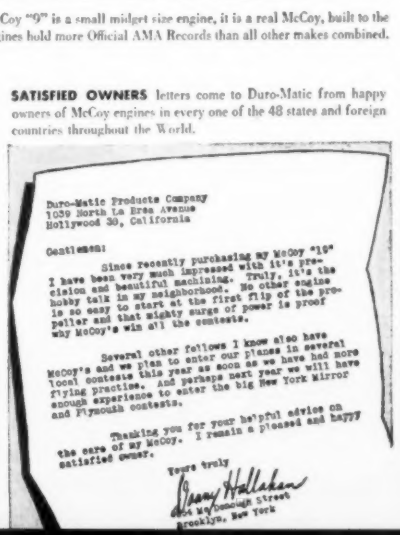
It looked as though the hobby business had at last an appeal for the great general public and in sales the leader might be as difficult to catch, as was his McCoy engines in the nation's model contests.

McCOY ADVERTISEMENTS stress the fact that although the new McCoy "9" is a small midget size engine, it is a real McCoy, built to the same precision standard to develop more power. The reason McCoy engines hold more Official AMA Records than all other makes combined.

PROUDEST POSSESSION of Duro-Matic Products Company is the file of Official AMA Contest Board releases of National Records won by contestants using McCoy engines.



SATISFIED OWNERS letters come to Duro-Matic from happy owners of McCoy engines in every one of the 48 states and foreign countries throughout the World.



Duro-Matic Products Company
1039 North La Brea Avenue
Hollywood 38, California

Gentlemen:

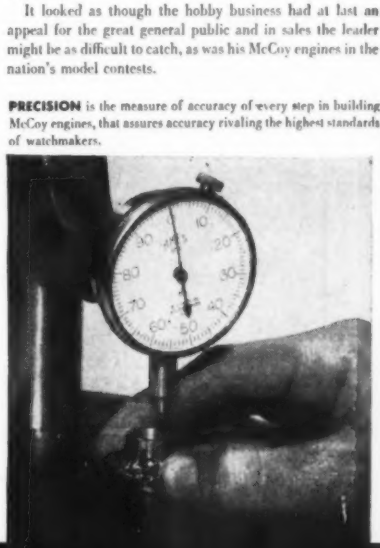
Since recently purchasing my McCoy "19" I have been very much impressed with it's precision and beautiful machining. Truly, it's the hobby talk in my neighborhood. No other engine is so easy to start at the first flip of the propeller and that mighty surge of power is proof why McCoy's win all the contests.

Several other fellows I know also have McCoy's and we plan to enter our planes in several local contests this year as soon as we have had more flying practice. And perhaps next year we will have enough experience to enter the big New York Mirror and Plymouth contests.

Thanking you for your helpful advice on the care of my McCoy. I remain a pleased and happy satisfied owner.

Yours truly
Jerry Hallahan
1064 Marlborough Street
Brooklyn, New York

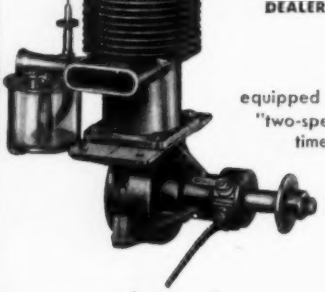
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is changed. C_2 is a small mica, or ceramic capacitor, used to bypass R.F. energy around the local battery circuit.

The two Sylvania Type 1N56 high-conduction germanium diodes are connected with their anode terminals to the ends of coil L_2 and their cathode terminals (labelled "CATH" on the crystal cartridge) together and to one end of the relay coil. It is imperative to observe the correct polarity of the crystal diodes *and* of the battery, as shown in Fig. 2, when wiring-up this circuit.

B is the local bias battery which, for size and weight considerations, may consist of several 1-1/2-volt pen-size flashlight cells connected in series. R is a 3,000-ohm midget rheostat used to set the value of current through the relay coil. The size of the battery, in conjunction with this rheostat, will be determined by the sensitivity of the relay (that is, the number of milliamperes or microamperes required to actuate the relay).

The sensitive relay used for these experiments was an 8,000-ohm *Sigma;* this relay is obtainable in war surplus for a dollar or so, and is ideal for our use, since it is very easy to adjust. It is possible that a lower resistance relay would work even better than the 8,000-ohm unit shown here, but this was not tried. A lower resistance coil in the relay would mean that the bias battery could be of lower voltage (although the current drain would, of course, be higher) and it would be possible to use fewer pen-cells in series for this purpose.

By adjusting the spring tension of the relay, reliable operation was had at 1-1/2 milliamperes. This required 6 volts of battery which was obtained from four 1-1/2-volt pen-size flashlight cells in series.

The same battery may be employed to actuate the controlled device in the model plane (if the battery voltage is sufficient for this purpose) by making the dotted-line connections shown in Fig. 2.

When rheostat R is set so that battery current flowing through the relay coil is very close to the threshold of operation of the relay, the crystal diodes then need to supply only a few hundred microamperes of additional current from rectification of the radio signal.

The battery must not be left connected in the circuit when the apparatus is idle, since the continuous current drain through the diodes and relay coil, while small, eventually will devitalize the battery.

ADJUSTMENT AND OPERATION. The receiver first must be tuned-up to the frequency of the control transmitter. To do this:

(1) Switch on the transmitter, using an unmodulated signal.

(2) Attach to the receiver pickup antenna the two leads from coil L_1.

(3) Place the receiver reasonably close to the transmitter, but not closer than about 10'.

(4) Temporarily remove the battery and connect a 0-1 D.C. milliammeter (or a D.C. microammeter, if available) in its place. The negative terminal of the meter must be connected to the lead from the center tap of coil L_2.

(5) Screw the metal slug halfway into coil L_2.

(6) With a sharpened bakelite rod, radio neutralizing tool, or other non-metallic screwdriver, turn the adjustment screw of tuning capacitor C_1 until a sharp maximum upswing of the meter pointer is obtained. At the exact point of maximum deflection of the meter, the receiver is tuned to the transmitter frequency.

(7) Switch off the transmitter, disconnect the meter from the receiver circuit, and re-install the battery. The tuning range of the receiver will be approximately 130 to 210 megacycles with the components specified in Fig. 2.

After the receiver has been tuned-up according to the preceding instructions, adjust the battery voltage in the following manner: (1) Keep the transmitter switched off for the present. (2) Vary rheostat R until the relay just pulls in. (3) Back off the rheostat setting until the relay just drops out. (4) Observe how small a rotation is made between these two settings of the rheostat, and carefully re-set the rheostat to a point just a little below the point at which the relay operates. (5) Switch on the transmitter and the relay should pull in quickly. (6) Switch off the transmitter. The relay should drop out.

POINTERS ON CONSTRUCTION AND INSTALLATION. *Vibration Proofing.* The author's tests do not indicate that the receiver is unusually susceptible to shock. However, the spring tension of sensitive relays ordinarily is slight, so that chattering of the contacts might possibly result from vibration of the motor. With this in mind, we recommend that the entire control receiver be mounted on sponge rubber or some similar shock absorbing material.

Handling the Crystals. The crystal diodes are of rugged mechanical construction and have been given standard drop tests by the manufacturer. However, they should not be handled carelessly. These diodes are provided with pigtails of good length and as much of this lead length as practicable should be used when soldered in place in the circuit. This will prevent the conduction of excessive heat from the soldering iron along the pigtail and into the crystal unit. A good scheme is to hold the pigtail with a pair of long-nose pliers close to the cartridge end of the pigtail lead while soldering. The larger metal mass of the pliers aids in conducting soldering iron heat away from the crystal unit.

Battery Circuit. The batteries and rheostat may be included on the mounting base with the other components, or (as in the author's unit—see photograph) the batteries and rheostat may be enclosed in a small lightweight plastic or thin aluminum box, and located elsewhere in the model, as required for proper weight distribution. Since the rheostat ordinarily will not need frequent readjustment, it will not be necessary to attach a knob to this component. Cut the rheostat shaft down to about 1/2" length and saw a slot in its end for adjustment with a screwdriver.

CIRCUIT COMPONENTS

B —Miniature battery (see text).
C_1—3-30-mmfd. leaf-type trimmer capacitor.
C_2—0.002-mfd. midget mica or ceramic capacitor.
L_1—1 turn of insulated hookup wire wound tightly around L_2.
L_2—Manufactured, slug-tuned high-frequency coil — National Type AR-2.
R —3,000-ohm midget rheostat.
Relay—8,000-ohm Sigma or equivalent.

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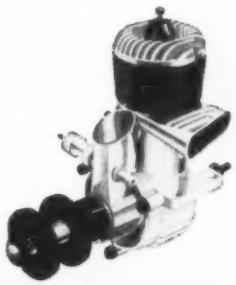




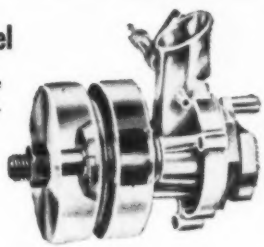
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Lockheed F-94

(*Continued from page 21*)

exit to the two seats.

First flight tests of the new plane showed it actually superior to F-80A and F-80B fighters then in service due to the use of an Allison J-33-A-23 jet engine, which develops 4,600-lb. thrust, considerably in excess of the engine used in the earlier models of the fighter. In addition, it was found that the added length increased the "fineness ratio" of the airplane with the result that its drag was reduced slightly. This added power and slightly reduced drag produced a two-seat training airplane that was actually faster than the fighter for which the student was being trained. Your *"Plane of the Month"* reporter had the fortune to take a ride in this prototype TF-80C and this short trip, with Lockheed Chief Test Pilot Tony LeVier at the controls, put old-fashioned propeller-driven airplanes in the antique class in a matter of minutes.

It would have sounded ridiculous to suggest sending a trainer into combat a few years ago but, believe it or not, that is just what the Air Force is doing with its new Lockheed F-94 all-weather fighter, for this mighty combat plane is nothing in the world but our two-seat trainer friend in a new guise! But the TF-80C was no ordinary trainer—its top speed of better than 600 mph is proof of that! The night fighter, created during World War II and pioneered with the Northrop P-61 *Black Widow*, has been considered heretofore as a highly-specialized type to augment the fighter force with a special weapon for night combat.

But the term *night fighter* is not fully descriptive of radar-equipped aircraft for they are designed to operate effectively "during periods of restricted visibility," which means not only night but in bad weather during the daytime too. And so the Air Force broadened the term to "all-weather" indicating that the new fighters can operate any time, regardless of conditions! Then, the Air Force took the final step—instead of just having a single squadron of radar-equipped fighters in a fighter group, why not have *all* Air Force jet fighters equipped for all-weather operation? And thus the new Air Force specifications for fighters specify all-weather operating capabilities.

Lockheed engineers viewed the new specifications and began studies of a new design to meet the problems. Then, it dawned that in the TF-80C there already existed a high-performance two-seat fighter and its side air-intakes left the nose free for the installation of the required radar equipment! But the new fighter had to have performance superior to anything that preceded it (otherwise, there was no progress). So Lockheed engineers solved this by the installation of an afterburner in the tail and they had it: the Lockheed F-94 all-weather fighter.

The turbojet engine afterburner is one of the simplest yet one of the most important developments in recent aircraft propulsion history. The turbine blades, upon which the hot gases from the combustors impinge, must be kept cool, otherwise they lose their strength and disintegrate. To cool this turbine, the turbojet engine simply pumps four times as much air through itself as it actually needs for operation. One-quarter of this air is used for combustion and the remaining three-quarters is cooling air! Engineers decided that some use could be made of this excess air after it had cooled the turbine, for it was simply being dumped overboard out the tailpipe. The answer lay simply in burning fuel in this air *behind* the turbine so that the added heat would not affect the turbine blading in any way.

Thus was born the afterburner, which, just as its name implies, is burning *after* the air has passed the turbine. Fuel lines are run to the tailpipe and into nozzles on the interior. The fuel spray mixes with the air and produces combustion that provide an enormous increase in thrust to the airplane.

Tests with the solar afterburner installed on an F-80 fighter, simulating the installation on the F-94, showed that the afterburner provided a 200% increase in thrust over the standard engine at sea level, or *three times* as much power for take-off as the standard installation! This means an accompanying increase in the rate-of-climb of the airplane so that there are few airplanes in the world that can match the new Lockheed F-94 at grabbing altitude in a hurry. The increase in top speed is not so spectacular, although it is substantial. The top speed of a jet fighter is limited by the critical Mach number of the airplane, for at this speed the drag increases almost instantaneously to two, three or four times its subcritical value. Thus, raising this top speed requires a tremendous amount of added power for only a few miles per hour more. But with the afterburner on the F-94, the top speed of the airplane is increased 10% at sea level, bringing it from over 600 to over 660 mph.

But these facts shouldn't indicate that the afterburner is a magical device that creates great power without a heavy cost for in aircraft design, as in all other things, "You don't get something for

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nothing" and the price, in this case, is a heavy increase in fuel consumption. For example, the standard jet engine uses between 500 and 600 gallons of fuel per hour but with the afterburner in operation this figure is increased to between 1,500 and 1,800 gallons, just three times as much! So figuring that three times as much power means using just three times as much fuel, the airplane can stay in the air only one-third as long and, even though it will be flying 10% faster. It means that the airplane will be able to fly only 36% as far as it could without the afterburner in operation. The result is that the afterburner is used only a small part of the time during a combat mission.

The Lockheed F-94 all-weather fighter has a span of 38′ 11″ (the same as the first production YP-80 airplane) but is 37′ 6″ long. It weighs nearly 10 tons fully loaded but combat weight is closer to 7 tons. The pilot is located in the forward cockpit and equipped with a small 'scope. The radar operator is located in the aft cockpit and operates all of the radar equipment. The plastic nose encloses the spinner antenna, which flashes a picture on the large scope in the rear cockpit. After directing the pilot to the near-vicinity of the bomber, the operator turns over the search to the pilot, who closes the range on his small 'scope. In addition, the F-94 has an identification set, which tells other fighters it is a friend and not a foe, a radar altimeter and other devices for navigating in bad weather. It is completely equipped (including four 20 mm. cannon) for seeking out and destroying enemy aircraft at night or in heavy fog, rain or sleet, and doing it at a terrific rate of speed. It is the first of a new family of fighters for our Air Force: the jet-powered, two-seat, all-weather fighter than can erect a defense barrier around the nation—regardless of the weather!

Design Forum

(*Continued from page 22*)

the wing high, above the thrust line, as in Fig. 3. It will be necessary to make struts that attach to the stick in order to support the wing in the proper position as indicated. These struts may be made of wire. Their upper ends may be cemented and bound with thread to two longitudinal wooden wing support stringers. Of course, these stringers should be at an angle to the thrust line of about 2° in order to give the wing an angle of incidence of 2°. The original tail planes may be used. Now, fly this plane and note its reactions. You will find it much more erratic and unstable, especially spirally, than the original model. After you have noted the difference in flight reactions between the first and second set-ups, add a vertical fin to the lower side of the motor stick as indicated by the dotted line #2, in Fig. 2. This has the effect of lowering the center of lateral area to the same point as of the original model, or slightly below it. This fin may be cemented in place or attached to two 1/8″ square horizontal balsa strips which fit up against the bottom of the motor stick. These, with the fin cemented between them, may be attached with rubber bands to the stick in the proper position.

Now with this arrangement, make your third series of tests. You will find that much of the erratic maneuvers are eliminated and that your model will have little or no tendency to spiral or bank steeply in turns. The fin should give it great steadiness. The reason for this is that the center of lateral area has been lowered to

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a point which is approximately on a level with the center of gravity so that any side reactions to sudden skidding or sideslipping do not create disturbing force couples. However, if it is rolled over sideways and the plane sideslips, this forward fin does not prevent recovery. The high wing and ample dihedral cause correction very quickly in spite of any side pressure on the fin below the center of gravity. There may be one difficulty with this set-up, however, because though we have lowered the center of side area, we have also *moved it forward* closer to the center of gravity by placing more side area at the forward part of the airplane. In other words, the center of lateral area is nearer to the center of gravity as shown by position 2, Fig. 3, of the C.L.A. In some ways this has the same effect as reducing the fin area of an airplane because reducing fin area, *moves the center of lateral area forward.*

A number of modelers, among them Raul Cardoso, of Rio de Janeiro, Brazil, has run into this problem concerning the size of the fin for any particular airplane. He tells us that he built two airplanes with fins of correct size relative to the wing area, but in the second one there was more area forward and greater dihedral. The second one had greater tendency to yaw than the first. Yawing means that the tail of the plane swings to right or left in flight with an oscillating motion. By giving greater dihedral, Mr. Cardoso provided more side area forward. Also there was more side area in the body. This brought the C.L.A. forward and closer to the center of gravity with the result that directional oscillations or yawing took place. Rules for fin area have been given as a *general basic* means for accurate design. In many cases the prescribed fin area (usually 12% for rubber models) may be a little small or large. This depends, as in our present case, on the dihedral used and the area of the body and/or wheels. Mr. Cardoso is correct in assuming that the proper placement of the C.L.A. is the PRECISE method to use, in order to obtain directional stability and eliminate any yawing tendency. If the C.L.A. is 15% of the tail moment arm (M, Fig. 1) rearward of the center of gravity, the plane should be directionally stable and should not yaw. On the other hand, if you have a plane constructed which has this yawing peculiarity, it may be corrected by ADDING fin area, because then the C.L.A. is moved FARTHER TO THE REAR and away from the center of gravity. It is possible that the distance between the C.G. and the C.L.A. may be made as much as 17% of the moment arm in some cases. In our third test arrangement, adding the forward fin without increasing the area of the tail fin moves the center of C.L.A. closer to the C.G. and induces a greater tendency to yaw, so the third series of tests may bring out this point. In flight the tail may swing from side to side. In the past when test flights have been made with planes of this arrangement, some have been known to oscillate and roll so violently that they will turn completely over, making a "barrel roll" in flight.

The answer to these questions are based on thousands of tests made from 1918 until the present. It has been found helpful on many of these tests to take moving pictures of the plane in flight so that reactions may be studied at will by running the pictures through a projector. They can also be run very slowly so that the reactions are more obvious. This system was followed during test flights with excellent results.

The correction for oscillation or this yawing tendency when the lower forward fin is added, is to *increase the size of the rearward or tail fin.* Another fin may be cemented to the stabilizer, extra strips of balsa may be cemented to the rear of the fin, or a fin, shaped like a fuselage (No. 3, Fig. 2) may be added beneath the stick. Such a fin or body adds area *at the rear* as well as forward, bringing C.L.A. *back* and *down*, position No. 3.

Incidentally, the position of the C.L.A. might be checked after this is done by cutting out a silhouette cardboard pattern of the side projection of the airplane (doubling the thickness of the cardboard where there are two elevations—such as two wing tip elevations, two wheels, etc.) with a rubber powered propeller. This silhouette should be made so that there is an area of cardboard representing one-half the propeller. The full amount is not needed because during one-half revolution of the propeller it presents no side area.

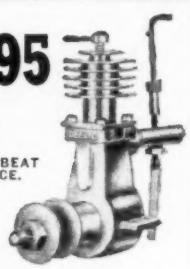
With proper fin area forward and rear and with the wing raised, this little plane should prove to be a steady and most consistent flier. It will climb well because the thrust line is below the line of resistance. In other words, the high resistance of the wing tends to pull back and the thrust line tends to pull forward, the two causing a nosing up or climbing force couple. The higher the wing is located above the thrust line, the greater this couple will be.

In one of our past issues we spoke of the advantage of a low center of gravity. Mr. Clive W. Schroeder, of 235 Grand

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Road, Durban, South Africa, tells us that "pendulum effect due to a low center of gravity causes spirals, because the low C.G. causes excessive banking." Mr. Schroeder is absolutely right *from his standpoint* but he is not taking into consideration one point which we took into account in the statement of our problem. With the center of gravity far below the C.G., steep banking and spiralling may result PROVIDED THE CENTER OF LATERAL AREA IS FAR ABOVE THE CENTER OF GRAVITY. This is often the case in many models where the center of gravity is well below the wing. It is not *the center of gravity below the center of lift* which causes spirals, but the center of gravity below the *center of side area* which produces them. This can be easily proved through tests of arrangement No. 1 in Fig. 2; that represents a low center of gravity, far below the center of lift or wing. Fig. 2, arrangement No. 3, also represents a low center of gravity, but with the center of lateral area properly placed relative to the C.G. Arrangement No. 1 may spiral, but arrangement No. 3 will not. So we see that it is NOT the position of the center of gravity *relative to the center of lift* which causes the trouble as Mr. Schroeder assumes. We appreciate greatly his stating this problem because it illustrates through his practical tests from an outside source that the center of gravity below the center of lateral area produces spiralling tendencies.

Now we are able to throw some light on Mr. Bob Stone's problem. He lives in St. Paul, Minn., and tells us that he has tried the C.L.A. theory in many ways and recently, supposedly disregarding it, he built a pylon job with a round fuselage and twin rudders. He says that he could not get this plane to spiral under any conditions and he wondered if the twin rudders had some effect. Mr. Stone is at least using his head because probably the twin rudders did have some effect; not only because they were twin rudders but probably because of their *position* in the set-up of the model.

This leads us to our fourth test. Suppose, instead of the fin being located above the stabilizer we invert the stabilizer and fin, attaching the tail unit so that the fin extends down from the stabilizer under surface as in Fig. 3. In this test, as the figure shows, no lower forward fin is used. Many model builders jump at the conclusion that because a model is a pylon or parasol model, the center of lateral area is high relative to the C.G. and not low. In many cases this is true, but in many others you will find upon testing for the position of C.L.A. that it is on a line with the center of gravity in accordance with requirements for maximum stability.

In Fig. 3, for instance, when the wing is high, the *center of gravity*, as in many gas jobs, may be well above the thrust line. If the landing gear of your test model is very light, the C.G. can readily be at the position indicated in the figure. Now, where is the center of lateral area when the fin area is low and the landing gear area is considered? By testing you will find that it is on a horizontal line with the C.G. provided the center of gravity is as indicated. If you will carefully test various pylon models, you will find the position of their C.G. as described here. The low fin at the rear actually lowers the center of lateral area to a proper position so that you have a pylon model, which many readers falsely assume we are talking against as such, when actually we are discussing positions of aerodynamic factors and not structural shapes and positions.

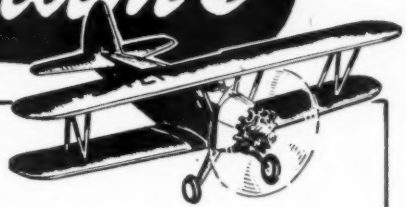
Lowering the fin at the rear as in Fig. 3 also creates a rolling axis R.R. which is slanted upward from rear to front. When such a ship rolls or banks it does so with the nose UPWARD, because if it rolls through 90°, the axis of the fuselage will be parallel to the rolling axis as viewed from the side.

Now we come to a less argumentative point in design but one which is extremely interesting and valuable for contest work; namely, the size of the stabilizer and its effect. Through your flights with the test model you will have learned how much to move the wing forward or backward to make correction for stalling or diving. In other words, you will have learned how sensitive your model is to this forward or backward movement. Now, for your fifth test, using the set-ups described in either Fig. 1 or Fig. 2, arrangement No. 3, equip it with a stabilizer that has an area of 50% of the wing area instead of 33% (Fig. 1, dotted outline). This may look cumbersome but fly it carefully and note the result. You will find that the model does not climb as steeply with any given setting of the wing. To make it climb you will have to move the wing farther forward so that the center of gravity is nearer to the wing trailing edge than the leading edge.

Mr. Stone asked one or two other questions. One of them concerns vertical wing tip plates or fins. These like many other airplane features are excellent in one respect and poor in another. They increase the efficiency of the wing because they prevent wing tip loss or "air

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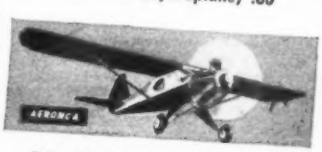
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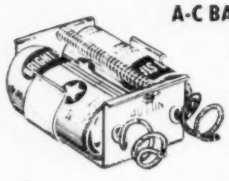
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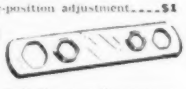


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spill." The air flows over the wing more smoothly and causes greater lift with less drag. However, considerable effect of the dihedral is lost with these tip planes because in sideslips where quick recovery is looked for, the plates blanket part of the wing and eliminate part of the dihedral's correcting effect. We do not advocate wing tip plates because under these conditions they cause more trouble than they provide advantage. We also wish to remind Mr. Stone that it is not necessary, as he may have observed, to make a deep belly on the fuselage in order to provide a low center of lateral area. Fig. 4 shows a plane without a deep belly on the fuselage, yet one which has a low C.L.A. In fact it is a parasol model with fins between the landing gear struts and below the fuselage.

"Hot" Engine Design

(*Continued from page 27*)

the difficulty. *Oilite* bearings are pressed from powdered bronze and graphite and oil-impregnated. Disk valves must be carefully fitted with the proper clearance between the disk and its seat (from .001 to .002 in.) to reduce drag and wear.

The shaft type of rotary valve is easy to lubricate and involves less frictional loss, but with this type it is difficult to provide a free gas flow to the crankcase, the hollow shaft in particular tending to be a bottleneck. Nevertheless, with careful design the shaft type rotary valve gives good results. I have had direct experience with the operation of two racing engines using shaft type rotary valves—the *Ball* and *Bungay*—and have found both to be fast and efficient.

In most racing engines the bypass or transfer passage is run from the cylinder intake port directly to the crankcase, with the addition in some cases (as in *Hornet*, *McCoy* and *Bungay*) of small auxiliary ports in the lower part of the cylinder wall and piston skirt. In the *Dooling*, however, all the gas mixture passes through large ports in the piston skirt and cylinder wall and then to the cylinder intake port by way of a very large, curved bypass.

The stroke of model racing engines is usually made a little less than the bore. The *Dooling* is a very short-stroke engine, the stroke-bore ratio being .74 to 1. The short-stroke design tends to result in a compact engine of low weight.

It may be pointed out that the stroke-bore ratio used does not affect the amount of gas expansion during the power stroke. It is obvious that with two engines of the same piston displacement but different stroke-bore ratios, the initial-to-final volume of the cylinder will be the same, assuming the same compression ratio is used. Or, if we consider the bore to remain fixed and the stroke increased, which will increase the displacement of the engine, then a greater charge will be taken in during the intake period and so expansion will be no greater, assuming the compression ratio is maintained constant. In other words, gas expansion is not a function of the stroke-bore ratio. And regardless of the stroke-bore ratio used, any desired compression ratio may be chosen.

When two engines with the same displacement and general design, but different stroke-bore ratios are operating at the same number of rpm, they will both be handling the same amount of gas per minute and should develop the same power, but the piston speed of the short-stroke engine will be lower. A low piston speed is favorable to reduced piston wear.

The thermal efficiency of an engine is the per cent of heat units of the fuel that is transformed into work. The thermal efficiency increases as the compression ratio is increased, but for ratios above 11 to 1, the increase in efficiency is small. I know of two manufacturers who experienced an actual falling-off in engine power, when the compression ratio was raised above 11 to 1. The cause may have been detonation, although methanol does not usually have much tendency to detonate. The cause of detonation is not fully understood despite the extensive research work on this subject. One theory is that after the gas in the vicinity of the spark plug is ignited, the rapidly moving flame front compresses and heats the remaining portion of the charge so that it reaches the self-ignition point and explodes violently.

The shape of the combustion chamber has a marked effect on detonation. In two-cycle engines the shape of the combustion chamber is influenced by the shape of the piston head, which must be designed to form a baffle to prevent the incoming charge from passing out of the exhaust port. Manufacturers of racing engines are giving considerable attention to improved piston head design. In the *McCoy 60* the contour of the piston head has been changed for better performance with hot fuels. The piston is now made of a special aluminum alloy with higher heat resisting properties and is webbed inside.

Presented in the accompany tables are the cylinder port timing for two Class D racing engines and a Class B engine; the rotary valve timing for four Class D engines and a Class B engine; and the weights of the reciprocating parts of four Class D engines.

CYLINDER PORT TIMING

ENGINE	Exhaust Opens Before Lower Dead Center	Inlet Opens Before Lower Dead Center	Exhaust Closes After Lower Dead Center	Inlet Closes After Lower Dead Center
Bungay 60	70°	63°	70°	63°
McCoy 60	68½°	55½°	68½°	55½°
Forster 29	65°	55°	65°	55°

ROTARY VALVE TIMING

ENGINE	Type of Rotary Valve	Opens After Lower Dead Center	Closes After Upper Dead Center
Ball 65	Shaft	50°	70°
Bungay 60	Shaft	69°	59°
Dooling 60	Disk	55°	55°
McCoy 60	Disk	56°	56°
Forster 29	Disk	25°	40°

(Total opening periods of rotary valves: *Ball*, 200°; *Bungay*, 170°; *Dooling*, 180°; *McCoy*, 180°; *Forster*, 195°.) Timing for *Dooling* obtained by measurement instead of from manufacturer.

WEIGHT OF RECIPROCATING PARTS

	Piston with Rings	Wristpin	Connecting Rod	Piston and Rod Assembly
Ball 65	.418 oz.	.098 oz.	.114 oz.	.631 oz.
Bungay 60	.256 oz.	.062 oz.	.150 oz.	.468 oz.
Hornet 60	.302 oz.	.117 oz.	.187 oz.	.606 oz.
McCoy 60	.382 oz.	.096 oz.	.169 oz.	.647 oz.

Model Portraiture

(*Continued from page 19*)

such as 25 (1/25 second) and 50 (1/50 second).

A camera having an 8 to 50′ focusing scale and a stop adjustment from f/11 to f/32 is suitable, although one with 6 to 100′ on the scale and adjustment from f/8 to f/45 is better. You probably have heard cameras described as f/8, f/11, etc., and assumed the numbers had something to do with focus because of the f/. The f/ refers to lens factor; an f/8 lens, for example, has a focal length that is 8 times the diameter of the largest stop opening used with the lens, or the largest useable lens diameter equals $\frac{\text{f (focal length)}}{8}$.

Some of the older makes of cameras are marked with the "uniform system" (U.S.) which has its equivalent in the "f system" as follows:

f/	8	11	16	22	32	45
U.S.	4	8	16	32	64	128

A 1-A pocket *Kodak* of the autographic type shown in Fig. 1, and manufactured about 1918, uses the U.S. lens stop marking. It will be used as an example of an old make of camera suitable for our purpose in this and the four following articles to appear in this magazine. It has a rapid rectilinear lens assembly well suited to be used with various supplemental lenses for close-ups and for time exposures of mechanical subjects. The diaphragm is capable of opening to U.S. 4 which permits sufficient light to enter through the lens for ground glass focusing.

In shopping around for a secondhand camera, one consideration, of course, is size. One using 2-1/4" x 3-1/4" (No. 120 film or equivalent) is suitable though smaller ones can be used but you will usually want to enlarge the pictures. For good definition of details in your pictures the 2-1/2" x 4-1/4" size (No. 116 film) is about right for Model Portraits and is a popular size as far as 20- to 40-year-old cameras are concerned. You will probably find a greater inexpensive secondhand selection of these available than any other size.

A secondhand camera can usually be found with most of its parts in good mechanical condition, or at least in good enough condition so that you can put it in first class shape yourself. This doesn't apply to the bellows, however. It is likely to have light leaks unless it has been well taken care of.

To inspect for leaks hold a 5 or 10 W lighted bulb inside the bellows in a dark room. Inspect the entire surface and especially the corners where leaks usually show up first. Rub the bulb along each corner with sufficient pressure to unbend the folds. If you find only a few leaks they can possibly be repaired with bellows mending tape although this is sometimes difficult in the corners. If there are any leaks there, it is best to install a new bellows and in fact it will be best to do so anyway to save yourself the bother of constantly wondering if leaks are developing while the camera is in service.

The cost of a bellows installed is $4 to $6 at a camera repair shop. It isn't such a difficult job to install one yourself, however, a new one being usually procurable direct from the factory for $1.50 or $2.

The bellows on the camera shown has a metal frame at the large end held against the film frame at the back of the camera by three fingers at each side, two at the top and two at the bottom which

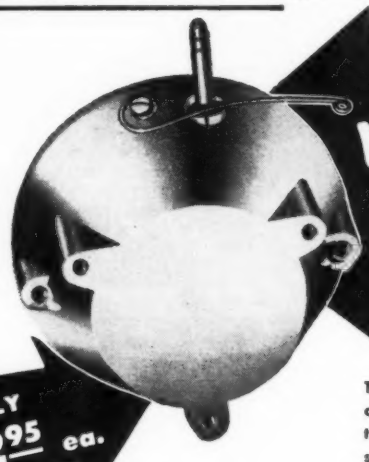
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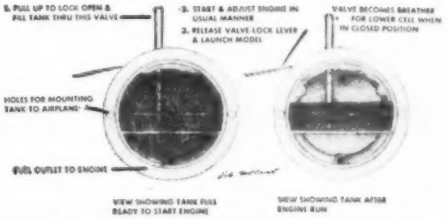
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extend from the inner edge of the film frame and are bent around the inner edge of the bellows frame. The small end of the bellows has a metal plate mounted on the lens board of the camera by two rivets. First remove the lens barrel from the lens board by unscrewing a threaded ring inside the bellows. This is best done after unscrewing the inner lens and then engaging the blade of a putty knife with the opposite notches of the threaded ring.

Next carefully unbend the finger at the back and remove the rivets at the front whereupon the old bellows can be removed. Send it to the factory so they can furnish you the proper size new bellows unless you have their price list in order to determine the correct part number. Install the new bellows by rebending the fingers to their original shape after the new bellows frame is positioned. Instead of using rivets at the front, thread the holes in the lens board (about No. 2-56) and use short screws.

Model Portraiture is relatively simple once the underlying principles are understood. A good picture can be produced by having, in general:

(1) A vibration-free support for the model.

(2) A proper background well lighted so the model doesn't cast shadows on it.

(3) Lots of light on the subject itself as the camera can "see" only as well as a good human eye but takes more time to record what it sees when the diaphragm is stopped down.

(4) Lights properly placed to light the subject for securing best perspective appearance in the picture.

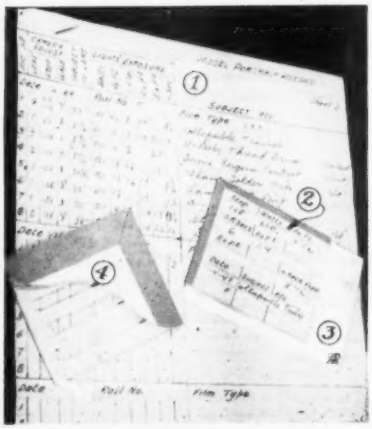
(5) A camera mounted against vibration.

(6) Proper focus and time exposure.

Reflector-equipped photo flood lights, supporting stands for them, a tripod for the camera and a series of different power attachable portrait lenses can be purchased ready-made, but many modelers prefer making these items so as to have that much more cash to invest in films and prints.

The series of articles above referred to will take up all necessary phases of model portraiture from the making of all necessary camera accessory equipment for $7 or $8, to the taking of pictures and the keeping and comparing of records so that progressively better pictures can be made. They will fully explain construction details including a portrait attachment utilizing telescope, field glass, spectacle, and reading lenses to take clear pictures of small objects only a few inches from the lens of the camera.

IMPORTANT NOTE: The reader who intends to follow this series of articles should save this one for future reference to study and review when considering articles 2 to 5. Many of the photographs especially will be needed to help you construct the items of equipment that will be described.



The methods of keeping comparative records will be included in Part 5

Wakefield Impressions

(*Continued from page* 17)

English call "wind" cut loose. Before the winds came, however, one of the French team and also one of the Italian boys were unfortunate enough to lose their jobs O.O.S. Thanks to the excellent pre-contest preparation done by the S.M.A.E., however, local farmers found the airplanes, notified the field, and the models were returned in time to compete in the finals on the next day.

The wind calmed down enough that evening to allow testing, and everybody who had a model was out on the field flying. All our ships were doing pretty well, so about ten at night we went back and tried to sleep. I don't think that anyone flying in the contest the next day slept much that night. If they were like myself, they were planning on what to say when the old mug was being awarded to them. There's something about the night before the contest of contests that tears your intestinal fortitude to pieces.

They really had a set-up as far as picking a perfect flying field went. Each man had a separate room, and the flying field was a five or ten minute walk from Mitchell Hall, where our rooms were.

They had the flying area at the West end of the Aerodrome, with a separate tent set up for each competing nation. It was just too darned windy and wet to even think about giving our ships test hops, so we assembled them, and hoped for the best. The previous night all the team managers had drawn for flying order, and Frank Zaic had pulled seventeenth spot for us. Our flying order was to be: Naudzius, Petersen, Boyle, Lidgard, Hanford and Fletcher.

While we were making our final checks, the announcement came over the public address system that one of the Belgian team had turned in a 4-1/2 minute O.O.S. flight. Then we stood in the doorway of the tent and watched B. B. March's ship do about the same time, also O.O.S. Everybody and his brother turned out to watch Roy Chesterton put his *Jaguar* up for a first flight. The ship climbed nicely, in spite of the wind, but only turned in 2:40. Then we all went out to help get Ed Naudzius' ship off for his first crack at five minutes. The wind was so strong when he flew that all the covering on his wing wrinkled like a prune from his efforts to hold the ship down. Ed's first flight was just about like Chesterton's. Nice altitude, but no help from thermals. Andy Petersen got his job off a little cross-wind, and the wind blew it in before the ship could get its nose up. He was delayed and retired to the tent to do some repair work. Joe Boyle got off nicely and turned in about 2-1/2 minutes for his first attempt. At this time, the contest was called for lunch, so we returned to Mitchel Hall for chow.

Ed Lidgard was next. His ship jumped off, climbed to terrific altitude and

promptly spiraled down on the glide. I had a try at it next. Just as I released the ship, a gust of wind hit it, flipped it upside down, and the prop shredded itself to pieces in a losing fight with the paved runway. I put on a spare prop, and made two more attempts to get off, and was very successful in failing to do so. I succeeded in shredding another prop and in losing all time for my first flight.

Therefore, the first round was now left to Warren Fletcher, and he came through in fine style, turning in a 4:56.6 flight, which stood as the high time of the contest until the closing minutes of the competition. Unfortunately, the model was lost on this flight.

In the next round, Naudzius turned in a little over three minutes, Andy Petersen was flying a practically new ship as a result of the rebuilding he had done, yet his ship hit almost two minutes. Then Joe Boyle came through. He had added another loop of rubber to give his ship extra zip because of the high wind conditions, and it climbed beautifully and floated away for 4-1/2 min. O.O.S. The sad part of this is the fact that he never recovered his model in time to put in his third flight. The ship is somewhere still in England as this is being written. He might have brought the Cup back had he made that 3rd flight!

Ligard's second flight was a duplicate of his first, in spite of his attempt to take the dive out of the glide. The altitude gained in the climb was again terrific. If the glide had been good, the old Cup would have been within reach. My ship was still in the repairing process, so the officials gave me a bye. Fletcher still hadn't gotten his model back, and was unable to fly.

Now we come to the most thrilling ending to a contest that it has ever been my privilege to witness.

Just at the start of the third round, Junior got his plane back. The right wing tip was badly damaged, but he put it back together as best he could and immediately went out to fly. Due to the damaged wing, the ship only turned in a little over 2 min. But at this point of the contest it looked like he was the odds-on favorite to win. He went out to fly his third attempt and turned in 1:58. Everyone was certain that, wind conditions being what they were, no one could touch his time. But the ways of model contests being what they are, such was Warren's luck that the wind abated somewhat, and Aarne Ellila, of Finland, and Signor E. Sadorin, of Italy, came from behind and turned the trick.

I watched the timers on Ellila's flight, and not once did they look down at their watches, nor did anyone tell them how much time Ellila needed to win.

Sadorin was the only modeler to hit the 5-minute maximum flight time, and he beat Fletcher out of second slot by only *three tenths of a second total time.*

Thus the U.S. cause was left up to Ed Naudzius. He really cranked the turns in his ship, and turned in a flight of 3:16. It wasn't quite enough. Afterwards Ed told us that he didn't realize just HOW close he was, and to quote him, "If *only* I had put in just a few more turns!"

Actually, the weather conditions were such that it was anybody's contest. The model that won was ten years old, used a gear box to utilize the power from two motors, had a rudder a foot high, a small two-bladed free-wheeling prop, and a bird-cage two-wheel landing gear. And Aarne Ellila was the lone representative from Finland.

As soon as it was certain that Ellila had won, the fellows from the Scandinavian countries picked him up on their shoulders and carried him towards the officials' desk. But before they arrived there, they formed a ring around him and proceeded to toss him in the air as high as they could, to the accompaniment of cheers from all the modelers.

When Aarne was presented with the greatest of all model awards at the presentation ceremonies the following evening, he gave a short speech first in his native tongue, then he spoke in English to the assembled competitors. He expressed his thanks and said that he hoped to see us all in Finland next year.

Every one who competed in the Wakefield was awarded a beautiful chromeplated ash tray inscribed with "Wakefield 1949" and the S.M.A.E. emblem. The various team managers also received the same award, and U.S. Manager Frank Zaic made a speech and told a joke which people are still asking him to explain. Frank and Henry Nicholls were undoubtedly the most well-liked fellows at the meet.

When modelers who don't speak a common language try to talk about models, it becomes a little difficult, and at times confusing. I'd like to tell you a true story about two modelers who were out chasing their ships on the day of the Wakefield contest.

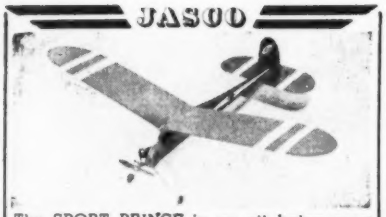
The first modeler flies his plane, and goes out to pick it up. While he is walking back, another modeler's plane lands in front of him, so he picks it up also. Modeler #2 sees that his ship is in safe hands, so he waits till #1 walks up to him.

#1 hands the ship to #2, and says in Pidgin English.

"Good model. How fly?"



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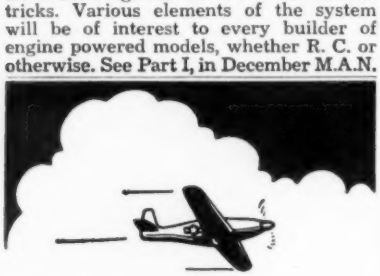
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Faced with the necessity of working out a variable speed system to install in his R. C. plane with a glow plug engine, Herb Owbridge has worked out some neat tricks. Various elements of the system will be of interest to every builder of engine powered models, whether R. C. or otherwise. See Part I, in December M.A.N.



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"Good," replies #2, and makes a motion with his arm to indicate a model flying.

"How *yours* fly?" asked #2.

"Good too," replies #1, using the same broken English and making arm gestures.

"Where you from?" asks #2.

"Ireland," replies #1. "Where *you* from?"

"Scotland," says #2.

For your information, dear reader, both Ireland and Scotland are "English speaking" countries.

The highlight of the social activities came the night of the Wakefield Cup presentation. We were all thirsty from almost losing our voices cheering when Ellila was awarded the Mug, so we retired to the social club that was a part of every barracks on the Aerodrome. By the time I had put my camera away and Andre Bernard, the French National Champ and I returned to the club the place was beginning to jump. Henry Nicholls really started things off by leading the house in the famous (or maybe infamous) French marching song, "Alleuete." Then Reg Dunning, of the Canadian Dunnings, suggested that since Henry was the chief processor of the contest, and since he processed our models, we should all have the privilege of processing Henry. This suggestion was met with enthusiasm. Henry was stretched out and his span, length, and cross section were computed. He was adjudged to meet the rules, so we turned him loose.

We will leave for London in the next paragraph, so I'd like to thank the College of Aeronautics, Cranfield, for their marvelous facilities, service, and particularly, for their patience.

We bid farewell to the scene of the "Wakefields," and return to London.

I would like to inject a serious note in closing by saying that this was the best contest that any of us have *ever* attended. There were no protests, a spotter and retrieving service that had an almost perfect record of recovery, and the nicest group of fellows anywhere. I wish I could list the names of all those who deserve the credit for making the 1949 Wakefield contest the success that it was, but that would be impossible to do, for every one did a superlative job.

After you have seen fellows who have no common language get along on the best of terms, it makes you wonder if model builders wouldn't make better statesmen and diplomats than the persons now representing the nations of the world.

Air Ways

(*Continued from page* 31)

only once in almost a year. Best speed made was 116 mph with a 8-11 single blade prop. A 7-10½ prop has been found to be more consistent, however.

Our sixth snapshot was sent to us by S. W. Baker (111 Hummel Avenue, Lemoyne, Pennsylvania) and shows one of his *Dyna-Jet* powered speedster, which has never failed to turn in over 100 mph. We are sorry to say, our contributor neglected to give details of his ship.

Evan Towne (928 Division Street, Huntington, Indiana) sent No. 7. It is a reverse sequence photograph; this is an "after" picture. In other words, it was taken after the original *Hot Rock* stunt job had been demolished. Mr. Towne included with the photos he sent us a picture of himself holding the remains after a big crash-up. Judging from the appearance of the wreckage, he has done a very fine rebuilding job.

The long lean free flight gassie in our eighth picture was built by Bill Venable (810 South Ingram Avenue, Lakeland, Florida). It is a sport job of his own design and has a wing area of 300 sq. in. and is powered by an *Arden .099*. The trophy and motor shown with the ship in the picture were second place prizes won at the Plymouth Meet, July 10, 1949, at Orlando.

The "Believe It or Not" ship in No. 9 is another Wakefield job dreamed up by the old master of the unusual, Joe Weathers (3850 West 111th Street, Inglewood, California). He states that the ship has not been completely tested but showed good possibilities at the West Coast Wakefield Eliminations. As may be seen, most of the vertical tail surface is built right into the fuselage itself. The results obtained show a very good climb and it is very stable under the full power of 25 strands of 3/16" rubber. The wing is 190 sq. in. and wing plates have been reduced by approximately 20% in area. Weight is 10½ oz. Most of the fuselage is covered with a very thin grade of nylon. We will be interested to watch further developments of this very unusual ship.

Our tenth snapshot is a very attractive biplane and is a 5' job designed and built by Edwin Stoffel (137 Quebec Road, Ilford, Essex, England). Although Mr. Stoffel sent us this photo along with several other beautiful ones, he unfortunately did not include any further details of this airplane.

News of Modelers

PEN-PAL SEEKERS: Fred G. Birden, 47 Radford Drive, Braunstone, Leicester, England . . . Benno Botterbusch, Hamburg-Blankenese, Iserbrook-Holtbarg 3, British Zone, Germany . . . Bertram E. Brakes, 13 Wigston Lane, Aylestone, Leicester, England . . . Donald J. Lanone, 5029 North Walnut, Spokane 12, Washington.

SPECIAL REQUESTS: Walter Hrbaczewski, 2048 West 70th Place, Chicago 36, Illinois, is interested in obtaining World War I photographs and books. The September and December, 1929, issues will complete John Mamkos's file of MODEL AIRPLANE NEWS and any person willing to sell these issues to him should write to 120 South Second Street, Lehigh, Pennsylvania. William C. Steaffens, 170 North Pearl Street, Berlin, Wisconsin, would like to trade solid scale model plans. A. E. Arnosti, 4744 North Larkin Street, Milwaukee 11, Wisconsin, will no longer be able to keep his back issues of M. A. N. (from June, 1938, to July, 1949), because he lacks storage space. Can anybody help him out?

CLUB NEWS

California

The *Dope Daubers* are becoming active again following a tryout contest which was held on August 14. No entry fee was charged, however. Results: *Beginners*—Richard Diebert 3:13; *Advanced*—Jack Goeringer 3:40; *Beginners H-L Gliders*—Sonny Valdex 24.3; *Advanced H-L Gliders*—Jimmy Bush 53.6.

Here are the winners of the monthly *Fresno Gas Model Airplane Club* Free Flight contest held July 31: *Class A*—Russ Basye 8:35; *Class B*—Ken Oldershaw 9:56; *Class C*—None; *Class D*—Fred Ginder 9:38.5; *Juniors*—Gerald Oldershaw 8:26.

Missouri

The 3rd Annual St. Louis Hobby Fair to be held November 6 and 7 in the Missouri City, will again feature model aviation as well as all other forms of

hobby work. Last year the *St. Louis Universal Airs* exhibited over 300 model airplanes which were of great interest to the spectators. Since this will be the only such show anywhere in the area, modelers are urged to enter exhibits and to attend the show. Full information may be had from O. Hansen, Lutheran Laymen's League of Greater St. Louis, 455 Lake Street, St. Louis 8.

Ohio

Here is the complete list of first-place winners of the Junior National Air Races. *Class. A Speed Open*—Harold De Bolt; *Senior* — Jack Breen; *Junior* — Arthur Koblenschlag; *Class B Speed Open*—Harold De Bolt; *Senior*—Al Stegens; *Junior*—Clay Boatman; *Class C Speed Open*—Walter Wencek; *Junior-Senior*—Al Stegens; *Class D Speed Open*—Harold De Bolt; *Junior-Senior*—Sterling Radway; *Stunt Open*—Harold Thombs; *Senior* —Marshall Weber; *Junior*—Bob Webber; *Flying Scale* (combined ages)—Marvin E. Olsen; *PAA-Load Class A Open*—Ernie Shailon; *Junior-Senior*—Lyman Slack, Jr.; *Class B Open*—Jack Norris; *Junior-Senior*—Jim P. Kohls; *H-L Glider Open*—Carl M. Clark; *Senior*—Dick Dole; *Junior*—Steve Tischler; *Novice*—Ronald Dick; *Towline Glider Open*—Joseph Elgin; *Senior*—Jim Eberts; *Junior*—Allen Marvin; *Novice*—Sylvia Lanzo; *Cabin Open*—Joseph Elgin; *Senior*—Al Chute; *Junior* — Edward Petrushka; *Novice* — Sylvia Lanzo; *Rubber-Powered Stick Open*—Don Pagliai; *Senior*—Al Chute; *Junior*—Allen Marvin; *Novice*—Robert Petrushka; *Class A Duration Open*—Dick Verba; *Senior*—Dick Collins; *Junior*—Thomas McGredy; *Class B Duration Open* —Dick Korda; *Senior*—Joseph Kubina; *Junior*—Lyman Slack, Jr.; *Class C & D Duration Open*—Anthony Terrigno; *Senior*—Richard Dain; *Junior*—Samuel Dehelehan; *CO2 Duration*—Owen O'Malley. The *American Airlines Gas Model Club* won the Merit Finishing Company team trophy.

Stout Snout

(*Continued from page 23*)

cement instead of regular model cement for this. Then build up the pod with 1/16" sheet formers. Make sure the wing mount is strong. Sand lightly to remove all flaws and "scallop" the formers for a smooth covering job.

The original model was all red, Silkspan covered. A coat of high-gloss dope will also give "sun flash visibility" and is worth the trouble.

The nose and tail plug are laminated 1/16" sheet balsa. Note the method of anchoring the rear motor hook and the keying of the stabilizer to prevent shifting.

PROPELLER. More than anything else the climb of a model depends on the prop. Adjustments, good glide, plenty of rubber are of no value if the prop is poorly made.

We favor the two-bladed type since it is easier to balance and smoother running. Carve from medium balsa. Lay out the blank and cut with a coping saw. Drill the prop shaft hole and start carving. The two inside, or concave, surfaces are carved first and finished with sandpaper to remove all ridges and highspots. Carve about 1/8" undercamber in each face. Carve the convex surface last, leaving the blades about 1/8" thick at the point of maximum undercamber. Sand to an airfoil shape.

Use of a brass thrust tube will insure a true running prop. The shaft is 1/16" diameter music wire, and a ball bearing washer cuts friction. The unit will now really transmit those turns into climb and haul your ship up there.

WING. Wing construction is orthodox and should give the builder no trouble. All ribs are 1/32" sheet balsa. If hardwood is used, cut lightening holes. Ribs and other sheet members should be cut out before starting construction.

Build outline of the wing first, that is, the leading and trailing edges and tips. Cement each rib in place carefully and install the 1/16" sq. upper spar.

The 3/16" sq. main spar is built up separately, the dihedral angles being cut accurately and gussets cemented in place. Leading and trailing edges and the 1/16" sq. spar of the wing are then cracked and the main spar cemented in place. Since the main spar is built directly on the plan, correct dihedral is insured.

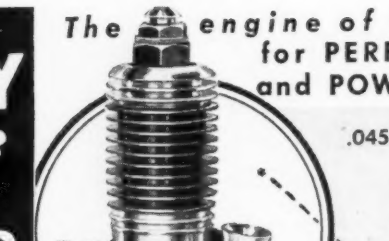
Cover the section from leading edge back to the 1/16" sq. spar with 1/32" sheet balsa. This is done by cementing the edge of the balsa sheet to leading edge of the wing first, then when the cement has dried, each rib and the spar are coated with cement and the sheet curved back and pinned in place until the structure has dried. Reinforce the trailing edge in center of the wing with .005 sheet aluminum to prevent the rubber wing bands from crushing it. Sand the entire structure lightly preparatory to covering.

Silkspan is the covering material, thick dope the adhesive. The Silkspan is applied wet. When covering the upper surface of the wing, dope the tissue only to the root rib, the leading and trailing edges, and the tips, or dihedral rib depending on the section being covered. This permits the tissue to tighten evenly



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over the entire surface of the wing as it dries. Since a flat bottom airfoil is used, the lower surface of the wing may be covered in the same way. When covering undercambered wings, it is necessary to dope the tissue to each rib to preserve the wing section. The wings should be given four or five coats of clear dope. Dope only one panel at a time and pin, or weight, down the leading and trailing edges to prevent the wing from warping. Incidentally, a few good heavy volumes come in handy for weighting down the edges. Matched books, such as encyclopedias, are useful in raising wing panels to the right height when putting dihedral in a wing. (However, protect the books from dope or glue stains with waxed paper.)

EMPENNAGE. The stab and rudders are in one piece and are removable. Note that the unit is keyed in position and will not shift.

The stab is covered in the same manner as the wing. Dope about three coats then cement the rudders in place, cut the keyway, and cement on the wire mount.

Keynote of empennage construction is lightness, if you are to avoid the necessity of weighting the nose.

FLYING. Check the balance in the usual way; it should be approximately at the 30% point of the wing chord. Glide the model into the wind. Correct diving tendencies with incidents in the wing, stalls with stab incidents. We used 12 strands of 1/4" flat brown rubber, 34" long well lubed. Always stretch and wind with a winder. About 150 turns will do for first tests. Climb and glide should be to the right. Adjust the thrust line sideways for this. Up and down thrust in small amounts on this ship has no effect; therefore adjust climb with incidence, if possible.

FLASH

(*Continued from page* 5)

the Atlantic in about 6 hours, while the C-102 is designed to carry 50 passengers at 430 mph on short domestic hops of less than 1,000 miles. Both are powered by four turbojet engines (the *Comet* by 5,000-lb. thrust DeHavilland *Ghost* engines and the C-102 by 3,500-lb. thrust Rolls-Royce *Derwent* turbojets) and feature pressure cabins tricycle landing gears and special design features for low-landing speed. Although neither plane is expected to enter airline service until 1952, they are already certain to be the first scheduled jet transport aircraft in the world.

THE QUESTION IS: Why hasn't the United States developed a jet transport? First of all, we have had the technical ability to design and build a jet transport anytime in the past three years but, in this most-prosperous of all the world's nations, there isn't the money for the job, believe it or not! No manufacturer has the $10-20,000,000 required for the job and no airline has the money required to buy such an airplane upon completion. At this impasse the matter rests with no solution (other than unpopular government subsidization) in sight—unless some MODEL AIRPLANE NEWS reader can think up one!

THE BRITISH recently kept a Gloster *Meteor* twin-jet fighter aloft over England for 12 hours! How? By flight refueling! The system used was not the familiar grappling hose method but a novel new device that may change the picture for jet fighter operations. The tanker trails a fuel hose with a large cone on its end, the apex forward. The jet fighter, a lance projecting from its nose, maneuvers this lance directly into the cone (identical to a hummingbird inserting its beak into a flower while in mid-air) and the fuel rushes into the fighter's tanks at the rate of 300 gallons per minute! In only two minutes the fighter

tanks are filled and it breaks loose to continue its assignment—all thousands of feet above the ground. The operation is entirely automatic and untouched by human hands. And the tanker carries enough fuel to handle 6-12 jet fighters in a single flight!

AIR FORCE has already selected the strategic bomber to replace the mighty Convair B-36 about 1954. It is the Boeing XB-52 jet bomber, which is essentially an enlarged version of the superfast swept-wing XB-47 *Stratojet* bomber. The XB-52 has passed through many stages, from a 500,000 lb. turboprop-powered behemoth to its present weight of more than 300,000 lb. It will be powered by eight XJ-53 turbojet engines rated at 12,000 lb. static thrust but capable of producting the astonishing output of 20,000 lb. thrust with water-injection and afterburners operating! The engines are suspended in pods as on the XB-47 except that the tip nacelles have two engines each. This huge bomber is designed for strategic bombardment, which means a range of better than 5,000 miles and probably closer to 10,000!

THE FIRST group of Boeing B-50 bombers has arrived in England, giving British technicians and citizens an opportunity to see this latest standard "Medium bomber" of the Air Force. The 43rd Bombardment Group is stationed at Sculthorpe, Lincolnshire, and will be rotated back to the U.S. after an extensive period of duty. The group includes the "Lucky Lady II," which completed a non-stop round-the-world refueling flight last March.

RYAN XQ-2 pilotless target missile was recently inspected by Air Force, Navy, and Army officers and approval for its production given. Although still on the classified list, the missile is described as about one-half the size of a standard fighter plane and will be used by all three branches of the services for aircraft gunnery and anti-aircraft training.

NOW THAT it looks like the Air Force fight for 70 groups has been lost for another year, its new 48-group organization will be made up of 4 heavy bomber groups (B-36), 10 medium bomber groups (B-29, B-50), 6 strategic reconnaissance groups (two of which will use RB-36E aircraft), one tactical reconnaissance group, 6 troop-carrier groups, one light-bomber group (B-45), and 20 fighter groups. This organization was announced by Chief of Air Staff General Vandenberg and approved by the Joint Chiefs of Staff.

OUR OWN National Air Races included a variety of Air Force and Navy jet aircraft this year but one of the most amazing air races in history was held recently in England. The following aricraft competed over a standard National Air Races pylon course: Hawker P .1040 jet fighter. DeHavilland *Vampire* jet fighter, and the tailless De Havilland D.H. 108 research airplane! The race was won by the new Hawker fighter, which averaged 545 mph on its best lap. In an even more amazing pylon race, the following mixture competed: Hawker P.1040 jet fighter, DeHavilland *Vampire* jet fighter, two Supermarine *Spitfire* fighters, a DeHavilland *Hornet* twin-engine fighter, a Blackburn *Firebrand* Naval attack plane, and a Hawker *Sea Fury* Trainer! The sleek Hawker also won this race and made 562.56 mph on its best lap. What we wouldn't give to see a U.S. race with a few North American F-86, Lockheed F-80, McDonnell F2H *Banshee* and Grumman F9F *Panther* fighters in a closed-course pylon race!

THE LONG-AWAITED Air Development Center for supersonic guided missiles is about to get under way after attempts to obtain Congressional approval since 1945. The Unitary Plan, under which new supersonic wind tunnel and secret research facilities would be built, is a joint Air Force - NACA - aircraft industry project which will eventually cost $1.1 billion. Congress has approved $311,000,000 to "get the ball rolling." This money includes $150,000,000 for initial construction of the development center and $161,000,000 for the construction of 22 new wind tunnels for the testing of transonic and supersonic aircraft and guided missiles.

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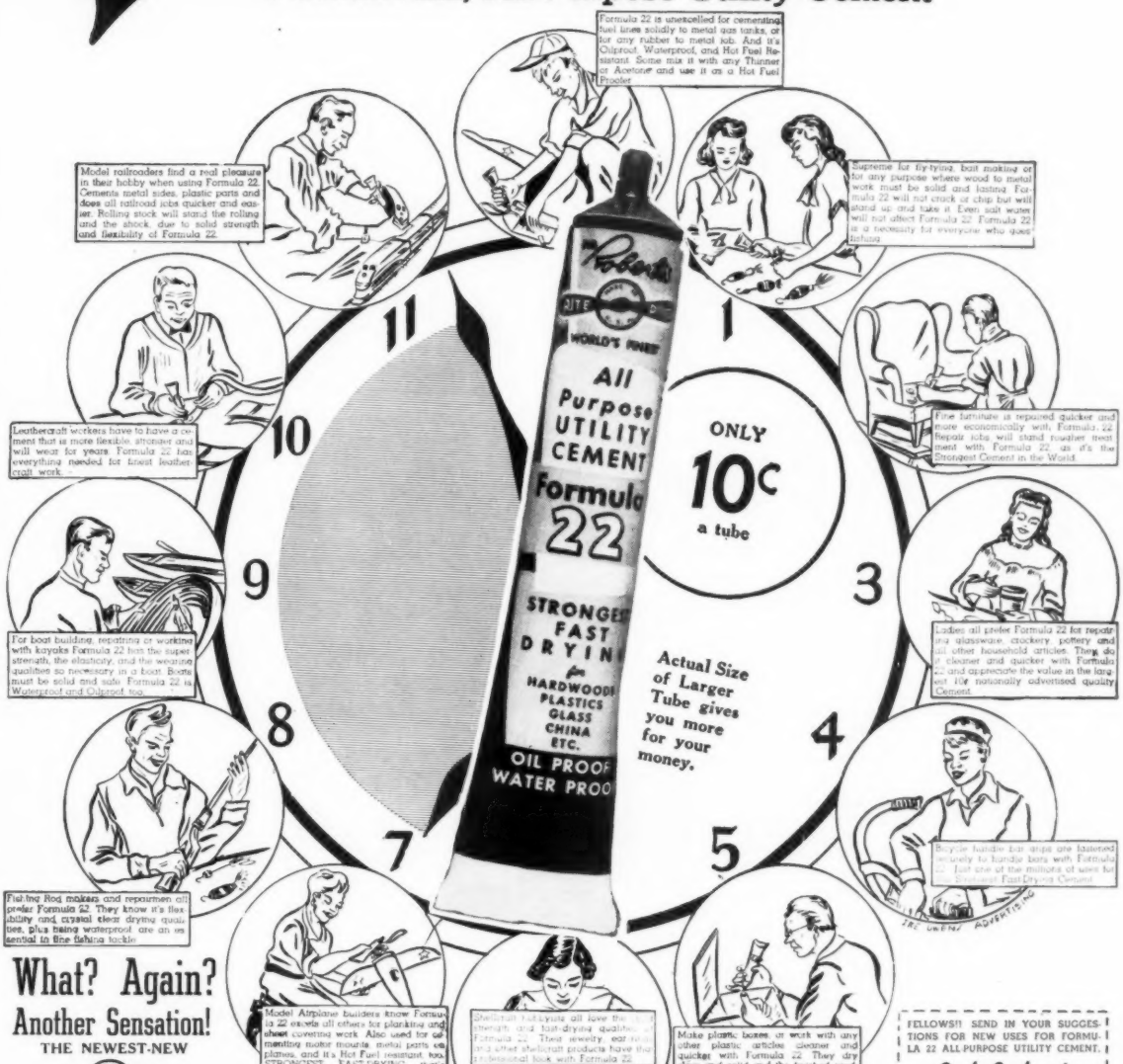
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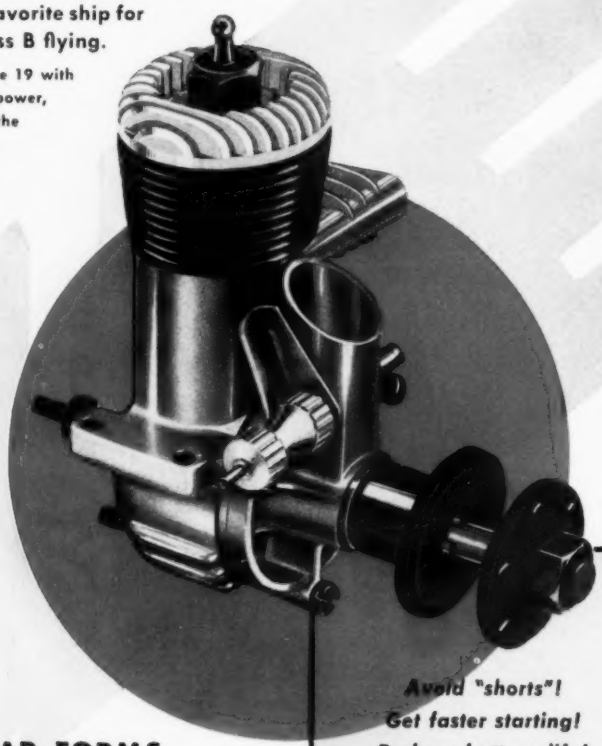
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